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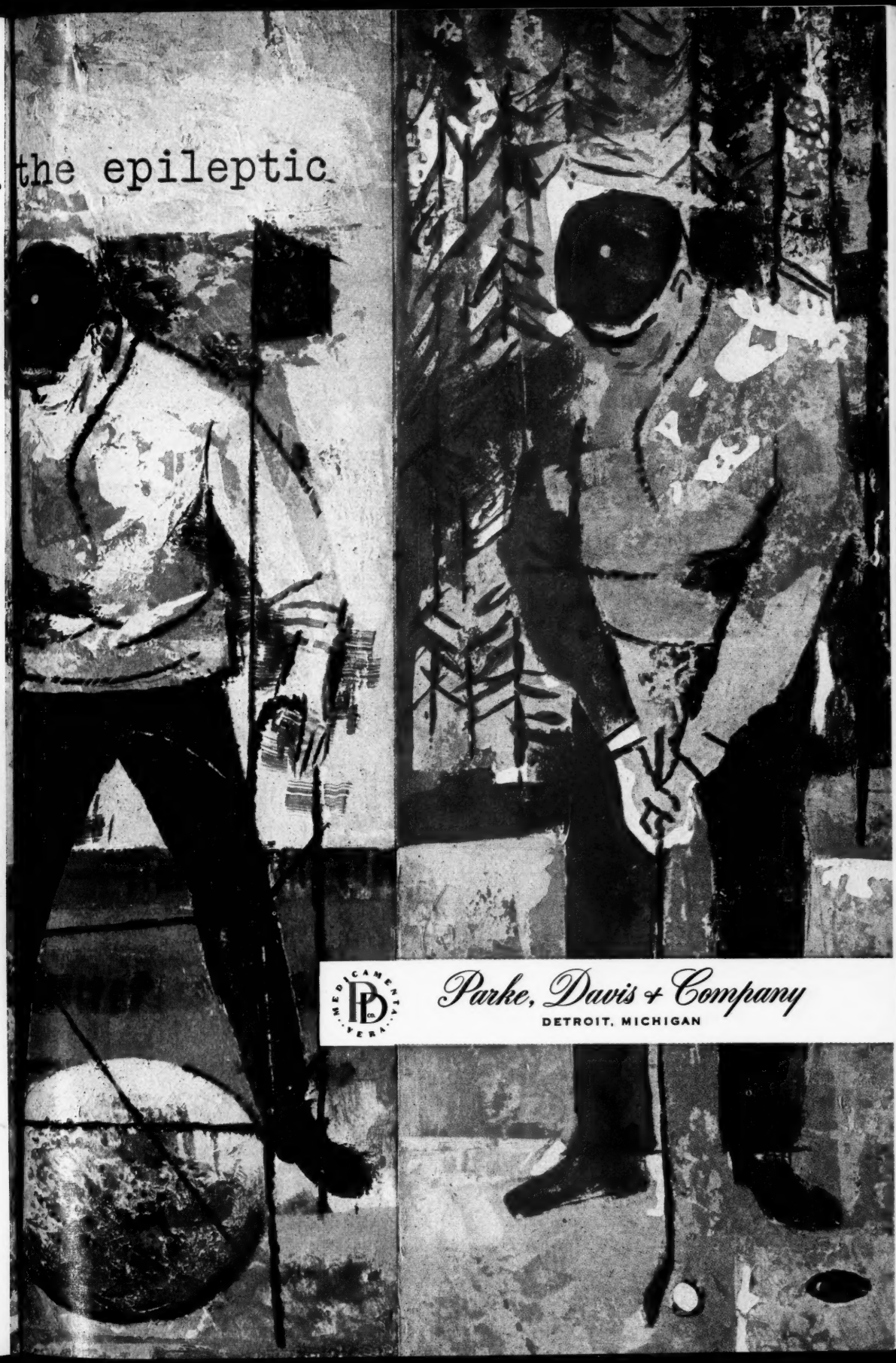

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Volume 38

Minnesota Medicine

Contents for

SCIENTIFIC ARTICLES

ORIGINAL CONTRIBUTIONS

Hysterectomies—A Study of 762 Cases
Charles H. McKenzie, M.D., Minneapolis, Minnesota 451

Indications and Contraindications for Adenotonsillectomy The Poliomyelitis-Tonsillectomy Problem
J. Donald Sjoding, M.D., Mankato, Minnesota..... 458

Hemolytic Anemia. Diagnosis and Treatment
Paul S. Hagen, M.D., Minneapolis, Minnesota..... 463

Cancer of the Thyroid. Fifteen-year Study in Duluth
Kenneth A. Storsteen, M.D., and *Thomas O. Young, M.D.*, Duluth, Minnesota..... 468

Tumors of the Parotid Salivary Gland
Robert W. Utendorfer, M.D., Minneapolis, Minnesota 476

Intestinal Obstruction due to Inflammatory Strictures
Earl G. Yonehiro, M.D., Grafton A. Smith, M.D., and *John F. Perry, Jr., M.D.*, Minneapolis, Minnesota 481

SPECIAL ARTICLE

Motor Vehicle Safety for Minnesota Children
Earl M. Larimer, Saint Paul, Minnesota..... 48

SEMINAR

The Drug Therapy of Hypertension
Thaddeus M. Chao, M.D., Minneapolis, Minnesota.... 48

LABORATORY AIDS

Leukemia or Leukemoid Reaction?
John D. LeMar, M.D., Fargo, North Dakota..... 49

CURRENT CARDIAC CONCEPTS

The Use of Quinidine in Clinical Medicine
Samuel A. Weisman, M.D., Los Angeles, California.... 49

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Minnesota Medicine

Number 7

for July, 1955

MISCELLANEOUS ARTICLES

EDITORIALS
The Doctor and the Press 501
Privileged Communications 502
Disease: Oral and Extra-Oral 503
Training Laboratory Aides 504
National Association of Boards of Pharmacy 504
The Rorschach Test 505
Social Security Disability "Freeze" Provisions 506
Motor Vehicle Accidents 506

PRESIDENT'S LETTER
The AMA Meeting 507

MEDICAL ECONOMICS
AMA Session: Democracy in Action 508
Economist Forecasts U. S. in 1960 510

MINNESOTA STATE BOARD OF MEDICAL EXAMINERS
Minneapolis Man Sentenced on Abortion Charge 510
First Prosecution under Physical Therapy Law 510
Minneapolis Woman Sentenced for Abortion 530

AMERICAN MEDICAL ASSOCIATION
Proceedings of the House of Delegates 511

MINNESOTA ACADEMY OF MEDICINE
Meeting of October 13, 1954 514
The Pathogenesis of Hyaline Membrane Disease of the Newborn.
James R. Dawson, Jr., M.D., Minneapolis, Minnesota 514

HISTORY OF MEDICINE IN MINNESOTA
The Pioneer Doctors of Chippewa County Prior to the Year 1900 *(Continued from April issue)*
Leon G. Smith, M.D., Montevideo, Minnesota 519

REPORTS AND ANNOUNCEMENTS 524

IN MEMORIAM
Edward Harold Frost 525
Wendell B. Grinnell 525
William Anthony Miller 525
Phyllis E. Rosander 525

OF GENERAL INTEREST
Personal News 526
New Locations 528
Minnesota Blue Shield-Blue Cross 528

BOOK REVIEWS 530

GROUP DISABILITY INSURANCE xxiii

INFORMATION

Illustrations (photographs, tables and graphs) should be submitted separately and not combined in the text. There should be a separate sheet entitled "Illustrations" which contains the various types of illustrations listed separately and numbered in the order in which they appear in the text. All photographs must be in black and white, clear cut, contrasting, and on glossy prints. Instructions for combining photographs are acceptable. Any number of illustrations over 4 are charged to the author. Combinations of photographs up to one-half page (6 x 4⅜ inches) count as 1 illustration.

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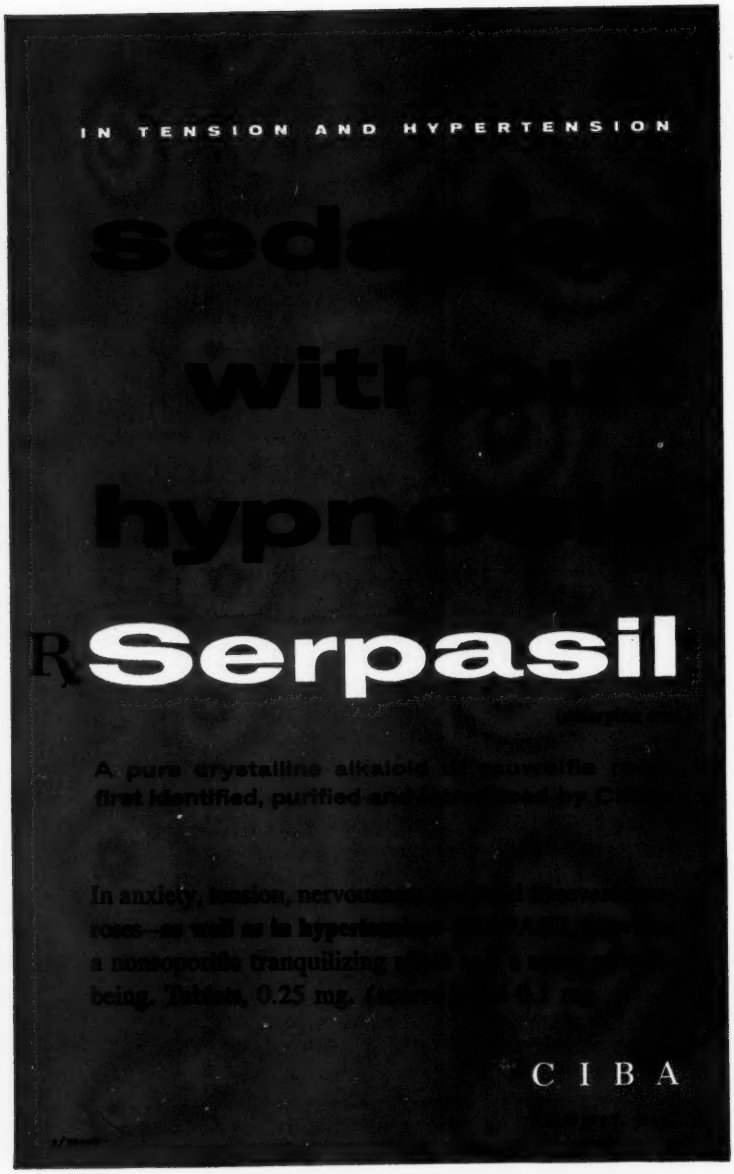

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Original Contributions

Hysterectomies

A Study of 762 Cases

CHARLES H. McKENZIE, M.D.
Minneapolis, Minnesota

A STUDY of the hysterectomies done by the surgical staff of Asbury Methodist Hospital between January 1, 1935, and December 31, 1945 —eleven years—was undertaken for the following reasons:

1. All the surgeons were willing to co-operate in the follow-up of these cases; such follow-up might add to our knowledge of the fate of the cervix in supra-cervical hysterectomies.

2. The morbidity before and after the use of sulfa drugs might be established.

3. The hospital stay and morbidity before and after the era of early ambulation might be shown.

4. The type of surgery and the complications found at a good general hospital during the decade could be compared.

The charts of all patients on whom any type of hysterectomy was performed during these eleven years were studied. Cesarean hysterectomies are not included. Many charts are incomplete in various details, e.g., on seven charts the age of the patient is not given. Consequently the figures on the tables to be presented do not always give the total of 762.

The number of hysterectomies done by years is as follows:

1935	53
1936	63
1937	63
1938	71
1939	51
1940	70
1941	65
1942	63
1943	71
1944	103
1945	89
	762

The variation in the number of operations done in each month for the years 1935-1945 is as follows:

	Hysterectomies
January	76—Most
February	64
March	70
April	76—Most
May	68
June	73
July	54
August	72
September	52
October	57
November	61
December	39—Least
	762

Types of Operations

Before proceeding further, the types of operations performed might well be classified. The most common approach has been, of course abdominable. However, fifty-one vaginal operations were done. The abdominal operations have been classified according to whether the cervix and/or ovaries were removed, as follows:

A = Cervix and one or both ovaries left in.
B = Cervix only left—both ovaries removed.
C = One ovary left in—cervix out.
D = Cervix, tubes, both ovaries removed—panhysterosalpingoöphorectomy.
V = Vaginal hysterectomy.

By far the greater number of operations were supracervical hysterectomies:—655 (86 per cent). Only 56 (7 per cent) were total hysterectomies in which the cervix was removed. The remainder — fifty-one — were vaginal hysterectomies. The accompanying table shows the types of operations according to the age of the patients.

CLASSIFICATION BY TYPE OF OPERATION AND AGE OF PATIENT

Age	A	B	C	D	V	*Totals*
20-29	20	2	1			23
30-39	185	21	5	8	5	224
40-49	277	51	9	15	13	365
50-59	62	22	2	8	16	110
60-69	4	2	1	6	16	29
over 70	1	1		1	1	4
not given	7					7
	556	99	18	38	51	762

Supracervical hysterectomies (A and B)—655 (86 per cent)
Bilateral oophorectomies (B and D)—137

A study of 762 hysterectomies performed at Asbury Methodist Hospital, 1935 through 1945 (follow-up on 506).

Presented before the Minneapolis Academy of Medicine, December 21, 1953.

Presented before the Minnesota State Obstetrical-Gynecological Society, April 24, 1954.

It is interesting to note also that the number of vaginal operations and of total (i.e., cervix removed) abdominal operations remains almost constant from 1935 to 1945 as follows:

	1935	1936	1937	1938	1939	1940	
Vaginal	3	6	3	3	3	4	
Total	4	5	5	5	4	5	
	1941	1942	1943	1944	1945		
Vaginal	3	7	4	10	5	=	51
Total	7	5	5	10	1	=	56

The preference for the supracervical operation instead of the total removal may be found in the discussion of complications and mortality. Recently, the type of 300 consecutive hysterectomies performed prior to June 30, 1953, was tabulated as follows:

Supracervical	181—60.3%	
Total abdominal	85—28.3%	39.6%
Vaginal	34—11.3%	
	300	

Age of Patients

The ages of these patients are shown on the following charts. Note: Seven charts had no record of the patients' ages and are, therefore, omitted, leaving 755 for the following charts.

By decades, the number of operations were as follows:

Age	*Operations*
20-29	23
30-39	224
40-49	365
50-59	110
60-69	29
Over 70	4
	755

The youngest patient was twenty-two, the oldest seventy-nine; the greatest number of operations, forty-five, were done on patients at the age of forty years.

The age at which bilateral oöphorectomies should be done electively at hysterectomy is always a matter of judgment and experience. The following table shows the ages in this group:

Age		*Per Cent of Total in Age Group*
20-29	2	8.7%
30-39	29	12.9%
40-49	66	18 %
50-59	30	27.2%
60-69	8	27.6%
Over 70	2	50 %

Vaginal hysterectomy was performed in only fifty-one cases (6.7 per cent). The age groups of this operation are as follows:

Age	*Number*	*Per Cent in Age Group*
20-29	0	0.0%
30-39	5	2.2%
40-49	13	3.5%
50-59	16	14.5%
60-69	16	55.2%
Over 70	1	25 %

The indications will be discussed later.

Anesthesia

During the decade 1935-1945 anesthesia underwent remarkable changes, and a study of the kinds of anesthesia for the hysterectomies done during this period is interesting.

Anesthesias are grouped as general, spinal and local, according to the type used at the beginning of the operation. General anesthesias include nitrous oxide, ethylene and cyclopropane plus oxygen, used chiefly to induce anesthesia, followed by ether. Occasionally in the 1940's pentothal was used to induce anesthesia. Curare was used a few times to produce relaxation, once with an unfortunate result. It was customary also to switch from one type of gas anesthesia to another, so that no table of the various types of general anesthesia can be derived from the records.

Spinal anesthesia was still popular, and local anesthesia was occasionally used. However, both of these anesthesias were frequently supplemented by general anesthetics. No local anesthesia was tried after 1940.

The following table gives the number of operations under the various types of anesthesia.

		Supplemental	
General	516		
Spinal	229	79	33⅓%
Local	10	9	90%

The number of patients requiring supplemental general anesthesia explains the popular demand for the easy induction by pentothal induction.

It is doubtful if the anesthesia contributed in any way to complications, but the following table of complications and mortality following operations done under these anesthesias is of interest.

	Operations	*Complications*	*Deaths*
General	516	58 or 11.2%	5 or 1 in 103
Spinal	229	24 or 10.5%	5 or 1 in 46
Local	10	1 or 10 %	0
	755		

It is interesting also to note that none of the vaginal hysterectomies was done under local anesthesia during this decade, twenty-seven being done under general anesthesia, twenty-four under spinal anesthesia.

Although spinal anesthesia is rarely used now, it will be of interest to note the kinds and amounts of the various drugs used.

Metycaine was used in only nine cases in doses varying from 100 to 150 mg. Procaine was used in doses varying from 120 to 400 mg., commonest doses being 150 in fifty-six cases, 200 mg. in thirty cases.

Pontocaine was most popular, being used in 120 cases in doses varying from 16 to 20 mg. Of these 120 cases, sixty-seven received 20 mg. of pontocaine.

	Spinal Anesthetics	
Metycaine	9 cases	100-150 mg.
Procaine	56 cases	150 mg.
	30 cases	200 mg.
Pontocaine	67 cases	20 mg.

In quite a few records the dosage of drug used could not be found so that complete tabulation is not possible.

Indications

The indications for the operations performed are derived from the internes' histories, for it is only occasionally during this decade that the surgeon included his indications in the dictated operative record. It is well known that private patients in a private hospital often resent internes' questions. This applies peculiarly to female patients, who often do not wish to give the intern much information concerning bleeding and pelvic pain. Therefore, the indications as tabulated may not be correct and may be incomplete. They are presented, however, as typical of a private hospital records. Frequently more than one indication is given, but no attempt has been made to classify these indications as main or secondary. On many charts no indications were noted.

The following indications are recorded:

Menorrhagia	188
Pelvic pain	144
Menometrorrhagia	124
Pelvic tumor noted by patient	81
Backache	39
Prolapse	25
Dysmenorrhea	20
Post-menopausal bleeding	16
Urinary retention	5
Leukorrhea	3

Of the twenty-three patients in the 20-29 age group, fourteen were operated on for profuse and prolonged bleeding. Of these, ten had dilation and curettage prior to operation.

Prolapse was treated by vaginal hysterectomy in twenty-three of twenty-five cases, twice by supracervical hysterectomy. Of the vaginal hysterectomies for prolapse, eighteen were done after age fifty.

Pathological Findings

The pathological findings in these pelvic operations have been gleaned from (1) the surgeon's dictated operative record and (2) the pathologist's report. In most cases, where both are given, there was agreement, except that many surgeons tended to overestimate the size of myomas and ovarian cysts. The largest myomatous uterus removed weighed 11 pounds. There were some uteri containing small fibromyomata. These the pathologist tended to call "fibroid" uteri and these are listed as such. No definite correlation could be found in the histories between symptoms of menorrhagia and size of myomata.

Prolapse and retroversion are noted in the pathological findings, these conditions being, of course, obtained from the surgeon's operative records.

Many women had multiple pathological pelvic findings. The pathological conditions are noted as follows:

Myomata, or fibromyomata	473		
Fibroid uterus	55		
Fibrosis uteri	29		
	557		
Cystic ovary or ovaries		147	
Chronic P.I.D. Frozen Pelvis			
acute P.I.D. and chronic salpingitis		59	
Hyperplasia of endometrium		41	
Endometrial polyp		40	
Multiple adhesions		34	
Chronic endocervicitis		15	
Endometriosis		4	
Tuberculosis - Salpingitis		1	
Prolapse of uterus		38	
Retroversion		16	
Dermoids of the ovary	Age 30-39	3	cases
	Age 40-49	2	cases
	Age 50-59	1	case
		6	cases

Pregnancy was associated with pelvic pathological conditions as follows:

Early Pregnancy	3 cases
Incomplete Abortions	2 cases
Ectopic Pregnancy	2 cases
	7 cases

There were 697 women in the age group 20-50 years; or, pregnancy in 1 per cent in the childbearing age.

Malignant conditions were found in forty-three hysterectomies as follows:

Carcinoma of the fundus	28 cases
Carcinoma of the cervix	9 cases
Carcinoma of the ovary	4 cases
Carcinoma of the tubes	1 case
Sarcoma of the uterus	1 case
	43 cases

Concomitant Surgery

In 285 cases, the operation performed was confined to the pelvic organs—uterus, tubes and ovaries. In 470 cases, however, or roughly two-thirds, one or more other organs or tissues were repaired or removed as follows:

Appendectomy	274
Repair cystocele and rectocele	85
Dilation and curettage prior to hysterectomy	79
Freeing adhesions	56
Cautery to cervix	17
Repair cervix	14
Hemorrhoidectomy	10
Repair ventral hernia	8
Repair inguinal hernia	3
Lepectomy	3
Breast biopsy	2
Cholecystectomy	2
Hymenotomy	1
Presacral neurectomy	1
Resection of sigmoid for carcinoma	1
Remove cervical polyp	1

In six cases angiomata, and other skin blemishes in other areas of the body were removed while the patient was under anesthesia.

Morbidity

Morbidity is difficult to define, but for purposes of comparison the temperature records were noted in all cases and the number with temperature of 100.4 degrees for any day have been considered as having morbidity. This is a very strict interpretation.

Comparing those with no concomitant surgery and those in which appendectomy was an added procedure, the following is noted:

Morbidity			*1 day*	*2 or more days*
No concomitant surgery	285	47 or 16.8%	53	185
Appendectomy	274	47 or 17.1%	63	164

It is obvious that appendectomy done at the same time as hysterectomy does not add to morbidity. It was noted, however, that no case in which hemorrhoidectomy was done escaped rise of temperature to 100.4 degrees or above. In general, all the other types of concomitant surgery do not add to morbidity.

Postoperative Complications

The complications noted on the fronts of the hospital charts are given, these complications being severe enough to have caused concern to the surgeon. Possibly a careful review of the progress notes might reveal other minor complications.

The following respiratory complications are then noted:

Pneumonia and atelectasis	19 cases
Pleurisy	3
Pulmonary infarction	2
Bronchitis	2
Upper respiratory infection	1

An attempt was made to correlate respiratory infections according to season of year, but when it was noted that five cases occurred in May, one in February, two in January, one in August, it was evident that no correlation existed.

Also, the cases with respiratory complications with and without concomitant surgery revealed no correlation.

With concomitant surgery	17 in 470 cases	3.6%
Without concomitant surgery	10 in 285 cases	3.5%

Other complications were as follows:

Infected wound and hematoma of wound	23
Urinary tract infection	9
Phlebitis	7
Pelvic abscess	3
Intestinal obstruction	2
Evisceration	2
Atony of bladder	2
Vesico vaginal fistula	1
Hemorrhage from cervix, postoperatively	1
Intra-abdominal-hemorrhage	1
Brachial artery thrombosis	1
Acute dilatation of stomach	1

Again, in these complications, there is no correlation with added surgery.

Hospital Stay

It was thought that after 1940 (1) the use of the sulfa drugs and later penicillin, and (2) early ambulation, might shorten hospital stay. However, this was not evident before 1946.

The shortest stay both before and after 1940 was six days. The longest stay in the period 1935-1940 was seventy-nine days. This patient had a pulmonary abscess and recovered. The longest stay in 1941-1945 was sixty days.

The average stay before 1940 was 15.1 days; after 1940, 14.3 days, a difference of very little significance.

Effect of Sulfa Drugs and Antibiotics

Before 1940 the sulfa drugs were used very infrequently, not more than three or four times in

this series. After 1940 sulfa drugs were used occasionally postoperatively and penicillin a few times in inadequate doses according to present standards. In the period 1940-1945 only 113 patients in this series, about 29 per cent, received sulfa drugs and/or penicillin.

A table of morbidity before and after this date and showing the use of sulfa and/or penicillin is interesting.

MORBIDITY BEFORE AND AFTER THE USE OF SULFAS AND PENICILLIN

	1935-40	1940-1945		1935-45
		a*	b*	
Supracervical	86.0%	80.0%	81.0%	83.7%
Total and vaginal.	95.7%	87.4%	79.4%	91.5%
All cases	87.7%	81.3%	85.8%	85.2%

a*—without sulfas and/or penicillin.
b*—with sulfas and/or penicillin.

It will be noted that the morbidity for all the hysterectomies over the eleven-year period is 85.2 per cent. Before the use of sulfa the morbidity ran 87.7 per cent. Note, however, that the morbidity when the cervix was removed during this earlier period was 95.7 per cent, whereas the morbidity for supracervical hysterectomy during this same period was only 86 per cent. Perhaps this will explain partially the preference for the subtotal operation.

After 1940 and the more general use of the sulfa drugs morbidity dropped to 85.8 per cent for those in which sulfa was used, and 81.3 per cent when sulfa did not appear indicated. It is in the series in which the cervix was removed that the greatest advance appears, for in this group of twenty-nine patients in which sulfa and/or penicillin was used, the morbidity dropped to 79.4 per cent. Remarkably, also, the morbidity in total hysterectomies done during this period, but where sulfa was not given, also dropped to 87.4 per cent. There is apparently an added safety factor by the general use of sulfa and/or penicillin in the hospital.

Mortality

Ten patients died in the first month after operation.

Ages	
37 years	1
40	1
41	1
45	2
46	2
47	1
48	1
51	1
	10

The causes of death were as follows:

	Year of Death
One died during operation—possibly due to curare	1945
One died of shock 65 hours after operation	1944
Three died on 6th day postoperatively	
—one of generalized infection	1941
—one of cardiac failure	1935
—one of pulmonary embolism	1945
One died on the 7th day, pulmonary embolism	1936
One died on the 13th day of paralytic ileus	1935
One died on the 20th day of pulmonary embolism —9 hours after hemorrhoidectomy	1937
Postoperative day—autopsy	
One died on the 22nd day of acute intestinal obstruction (autopsy)	1936
One died on the 30th day of acute intestinal obstruction	1937

Days after operation	Immediate	6	7	13	20	22	30
Number of deaths	2	2	2	1	1	1	1

Causes	No.
Pulmonary embolism	3
Acute intestional obstruction or paralytic ileus	3
Shock	1
Anesthesia	1
Generalized infection	1
Cardiac failure	1

Two autopsies were obtained.

Two died in 1935, Two died in 1936, Two died in 1937 } 6 in 371 or 1 in 62

Longest period without a death—July, 1937 to February, 1941—238 cases.

One died in 1941, One died in 1944, Two died in 1945 } 4 in 391 or 1 in 98

Two deaths followed panhysterectomies, i.e., two deaths in thirty-eight operations (5.2 per cent). Eight deaths followed supracervical hysterectomies: eight in 655 (1.2 per cent).

Follow-up

The ideal follow-up in any such series would be a pelvic examination with vaginal smears and indicated biopsies on all the patients by a single qualified individual. Manifestly this is impossible, so in any follow-up multiple contacts are attempted.

1. Each surgeon was mailed a card with a short résumé of each patient and was requested to supply any follow-up he might have about the patient. The response to this was very prompt and gratifying. Nearly 300 cards were returned within two months.

2. Subsequent admissions to Asbury Hospital of every patient were recorded by the record room. In many cases this record supplemented the surgeon's follow-up.

3. If the surgeon has moved or died, the cards were sent to the surgeon taking over his practice. Very few of these cards were answered.

4. Some surgeons suggested that the referring

doctor be contacted. This brought about ten replies.

5. Any patient, not accounted for as above, and whose name appeared in the phone book was sent a personal questionnaire. Out-of-town patients were also sent this questionnaire. There were thirty-four replies.

6. The Mayo Clinic gave a complete follow-up on one patient who died there of carcinoma of the duodenum.

Using these various means, a follow-up has been obtained on 467 cases. Of these there is a follow-up *for more than one year on 411 cases of supra-cervical hysterectomies.* This does not include carcinoma cases, on which special study is made.

Some report is given on forty-four cases during the first year. Of those followed less than one year the following two cases are of interest:

One patient had a bilateral salpingectomy for acute salpingitis two months after vaginal hysterectomy.

One patient had four laparotomies in the first year for intestinal obstruction.

Of those followed more than one year, the number is as follows:

	No. Cases	
1-2 year follow up	24	
2-3	21	
3-4	29	
4-5	23	
		97
5-6	29	
6-7	18	
7-8	40	
8-9	50	
9-10	40	
10-11	36	
11-15	125	
Over 15	32	
		370
		467

Of these 467 followed, seventeen were reported as dying of the following:

Cardiovascular disease	8
Diabetes	1
Carcinoma of G. I. tract	2
Carcinoma of breast	1
Epilepsy	1
Pernicious anemia	1
Tuberculosis	1
Pneumonia	1
Cancer of ovary (5 years postoperative)	1
	17

Remote Complications and Treatments

Urinary Complications.—There is no record that a ureter was tied or cut at the time of surgery. However, the follow-up reveals urinary complications in seventeen cases. Of these several had numerous cystoscopies. One patient had a nephrectomy, and the history in one other patient suggests that nephrectomy was done.

PELVIC COMPLICATIONS REQUIRING SUBSEQUENT OPERATIONS

Ovarian cysts removed	8 cases	
Bowel obstruction	6 cases	
Ventral hernia repaired	3 cases	
Appendectomy (15 mo.-15 yrs.)	2 cases	
	19 in 467	4%

TREATMENTS TO CERVICAL STUMP

Cautery to cystic and/or eroded cervix	23 cases	5.6%
Polyps removed from cervix	6	
Cervix removed	5	
Bleeding from cervix (cause not given)	3	
Developed carcinoma of cervical stump (Both found within one year of surgery. One patient died in six months; one, treated with radium. is alive and well after seven years.)	2 cases	0.5%
	39 cases	9.5%

Total treatments to cervix: 39 in 411 supravaginal hysterectomies, or 9.5 per cent.

Follow-up on Cases of Malignancy

There were forty-three cases of malignant disease for which hysterectomy was performed:

Carcinoma of fundus	28 cases
Carcinoma of cervix	9
Carcinoma of ovary	4
Carcinoma of tube	1
Sarcoma of uterus	1
	43 cases

Two of these died postoperatively, one from shock, one from septicemia.

Follow-up on the remaining forty-one cases was done by questionnaires to the surgeons, and to the patients, and by reviewing hospital records. Two other sources were used:

1. Dr. McKelvey kindly allowed a cross-matching of the names of all patients with carcinomas of the cervical stump in his records, with this list of patients. None of the Asbury patients were found in his group. (This provides a "negative" follow-up).

2. Dr. Rosenfield of the State Department of Health crossmatched their files. Two cases, not otherwise followed, were found in the death certificates on file at the State Department of Health. In spite of these searches, no follow-up can be found on four patients. Thirty-nine patients with malignant disease however have been followed,

three of them over fifteen years. This group added to the 467 makes a total follow-up of 506 cases in 762 hysterectomies (66 per cent).

The following table shows the follow-up on these thirty-nine cases:

	Fundus *No*	*Yes*	*Cervix*	*Ovary*	*Tube*	*Saf*	
Postoperative mortality.			1	1			2
Died Ca in 1							
Less than 1 year	5	1	3	1		1	11
Less than 2 years	6		1				7
Died other causes							
No recurrence	4 yr.	5 yr.		8 yr.			3
Alive and well							
5-10 yrs.	6	1	3	1	1		12
11-15 yrs.	2	2	1				4
over 15 yrs.	1	2					
5-yr. cures	9	6	4	2	1		22
Per cent 5-year cures	43%	85%	44%	50%	100%	0	51%

These figures, are, of course too few for statistical analysis but possibly may show a trend. Note that radiation to the pelvis for fundal carcinoma before hysterectomy gave a five-year survival rate of 85.7 per cent whereas in those cases not receiving x-ray, only 43 per cent survived five years.

The most remarkable case in this series is one of carcinoma of the cervix. This patient had a dilation and curettage and removal of cervical polyp prior to supracervical hysterectomy. Pathological report showed squamous cell carcinoma of the cervical polyp. Six months later the patient received 2500 mg. radium. She is alive and well in Minneapolis today.

The follow-up of the whole group shows twenty-two survived five years or more; and presuming that the cases unaccounted for have died of carcinoma, the survival rate for five years of the group of malignancies is twenty-two of forty-three (51.1 per cent).

Summary By Surgeons

Forty different surgeons performed these 762 hysterectomies.

16 surgeons performed a total of 42 operations
18 surgeons performed a total of 290 operations
6 surgeons performed a total of 430 operations

762

470 operations were done by fellows of American College of Surgeons, 195 by general practitioners, and 97 by the obstetrics-gynecology group.

Acknowledgments

I wish to thank the following persons for their co-operation: first, all the surgeons of the staff who replied to the questionnaires and résumés. Second, Dayton Shields, administrator of Asbury Methodist Hospital, who signed the numerous letters used in the follow-up of these cases. Third, the record librarians, particularly Alice Knudtsen, without whose help such a complete follow-up would not have been possible.

Discussion

PAUL N. LARSON, M.D.—It is evident that Dr. McKenzie has taken much time from his busy private practice to make this interesting survey. The detail and follow-up have brought many revealing facts to light.

The need for consultation in diagnosis and indication for surgery becomes apparent when 144 of 762 hysterectomies are performed for pelvic pain, or when eighty-six are found to be fibrosis uteri or fibroid uterus (not fibromyomata). Out of 762 hysterectomies only one in seven was done by a gynecologist.

Nine cases were performed for carcinoma of the cervix, but no other coincidental carcinomas were found in the remaining cervices removed routinely for benign conditions. One should find carcinomas in at least 2 per cent routine total hysterectomies for benign conditions.

In his follow-up he shows that 0.5 per cent of the sub-total group developed carcinoma in the stump. A total of 10 per cent of the stumps required subsequent surgery for one reason or another. Certainly these complications would make an operator think twice before doing a sub-total.

The morbidity figures in these series are very strict and difficult to compare since most groups use 100.4 for two successive days.

There was a low incidence of pre-operative diagnostic dilation and curettage, but that can be explained on the basis of only one case in seven being performed by a gynecologist.

A survey of this sort has brought many facts to our attention which have not ordinarily been considered. A city-wide study would no doubt demonstrate similar circumstances in all hospitals.

Let us again thank Dr. McKenzie for bringing us this review, for no doubt much good comes from stark realization.

JAMES F. SHANDORF, M.D.—I wish to take this opportunity to congratulate Dr. McKenzie on his most interesting paper.

On listening to this fine paper there are several points that impress me. First, I believe there were twenty-three patients in the 20 to 29 age group, and as I recall of this small group only ten had diagnostic curettages prior to surgery. I strongly feel that before any hysterectomy, regardless of age, it should be preceded by a diagnostic curettage.

Secondly, in the pathological summary, I believe there were only four cases of endometriosis. This seems like a very low figure, and one questions whether this entity was recognized as it is today or are we seeing more endometriosis than we did in the years covered by Dr. McKenzie's paper.

(Continued on Page 488)

Indications and Contraindications for Adenotonsillectomy

The Poliomyelitis-Tonsillectomy Problem

J. DONALD SJODING, M.D.
Mankato, Minnesota

ADENOTONSILLECTOMY continues to be the most frequently performed single surgical operation in Minnesota, as it is elsewhere. Proof of this is readily seen when one examines the financial reports of Blue Shield. Blue Shield records show that payments to physicians and surgeons for adenotonsillectomy exceeds the payments for any other single operation.

In recent years the lay public has been exposed to much publicity in the lay press regarding the possible danger of performing adenotonsillectomy during an epidemic of poliomyelitis. Physicians and surgeons, also, have been bombarded with voluminous medical literature concerning the relation of adenotonsillectomy to poliomyelitis. A review of the indications and contraindications to adenotonsillectomy, therefore, seems timely and desirable.

A few decades ago it was believed by the lay public and surgeons alike that everyone should have his tonsils and adenoids removed. Now-a-days even the domestic magazines warn parents that such is not the case and that there are definite indications for adenotonsillectomy. The operation can be very beneficial to an individual if indications for its performance are definitely present. What are these indications? Foremost in importance, and the most commonly used indication for the operation, I believe, is frequency of upper respiratory infections. When parents bring their youngsters to me with the question, "Should the tonsils and adenoids be removed?" my first question is, "How much trouble has the youngster had?" A helpful way to ascertain the frequency and severity of upper respiratory infections is to find out how much school the youngster has missed because of disabling upper respiratory infections. Frequent disabling attacks of colds, bronchitis, sore throats, tonsillitis, otitis media, cervical adenitis, and quinsy, undoubtedly are the most common indications for the operation. When there is a history of such frequent upper respiratory infections, and when the physical examination reveals deeply embedded, enlarged tonsils, and enlarged adenoids, one can be fairly certain that removal of such tonsils and adenoids will reduce the number of disabling upper respiratory infections.

In examining the tonsils, one should look for certain signs: Are the pillars chronically red? Is there a spotty exudate over the crypts? Also, are the tonsils embedded, such as shown by letter A in Figure 1, and can pus or exudate be expressed from the crypts by pressure on the anterior pillars? If the answer to these questions is yes, and if there is a history of frequent upper respiratory infections, I believe a diagnosis of chronic tonsillitis is justified. One can visualize large embedded tonsils if the anterior pillars bulge forward markedly when the individual gags. Also the examiner can get a good idea of how large and embedded the tonsils are by using a head mirror and reflected light, or a head light, and with a tongue depressor in each hand, exert gentle pressure on the anterior pillars. This will squeeze the tonsil to the midline and also express any deep-seated pus in the crypts. Such deep-seated pus would be overlooked by merely looking at the tonsil.

Some authorities[1] emphasize the importance of the way the tonsils are lodged between the palatal arcs and the role of mechanical factors acting on the tonsils. It was noted that in cases in which an assumption of focal infection was correct, as seen from the improvement following tonsillectomy, the tonsils were found to be lodged deeply between the pillars or embedded, as illustrated by letter A in Figure 1. The motions of swallowing were thought, therefore, to have an important role in the production of focal symptoms referable to embedded tonsils. Whereas,

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when the tonsils are normally situated, the constrictive action of the pillars and tongue during swallowing express the tonsillar content toward the oral cavity (Fig. 1, letter B), deeply seated tonsils are compressed readily in swallowing, with their contents being arrested along lines of least resistance, that is to say, toward the capsule of the tonsil. Special examination, with an opaque media injected into the crypts, seems to bear out these postulates.

When tonsillar contents are arrested deep in the crypts, they are more apt to set up chronic infection and thereby act as a focus of infection. We have, then, a second indication of adenotonsillectomy, namely, a focus of infection. I have found that tonsils which looked quite innocuous on their small exposed surface, but which were found to be deeply embedded, and from which I could express pus from deep in the crypts, were acting as a focus of infection, and were contributing to such conditions as chronic iritis, vasomotor rhinitis, possibly through the mechanism of bacterial allergy, nephritis, rheumatoid arthritis, rheumatic fever, and conditions simulating brucellosis, with weakness, sweats and chills. Gratifying improvement to complete relief have occurred in these conditions following removal of such deeply embedded tonsils.

Carriers of diphtheria can be rendered free of infection by tonsillectomy. It was found in a study[2] of a large group of British soldiers in Italy during the last War that 81.5 per cent were found to be free of infection by the fourth day after tonsillectomy.

Asthmatic individuals with large obstructing tonsils and adenoids can expect benefit by adenotonsillectomy. This benefit occurs as the result of possibly one or two mechanisms: One, removal of the large obstructive adenoids creates a normal nasal airway, so that the nasal mucosa can adsorb the inhalant allergens responsible for the asthma. Similar benefit occurs to adult asthmatics by removal of obstructive nasal polyps. Secondly, removal of large infected tonsils and adenoids eliminates a possible bacterial allergic factor in the cause of the asthma. Even if the lymphoid tissue in the throat becomes hyperplastic again, as it commonly does in allergic individuals after adenotonsillectomy, the operation is justified if this indication is present.

A very important indication for adenotonsillectomy is hearing impairment caused by large obstructive tonsils and adenoids. It has been a common experience to encounter children with impaired hearing who have large obstructive adenoids and dull, retracted eardrums. Complete

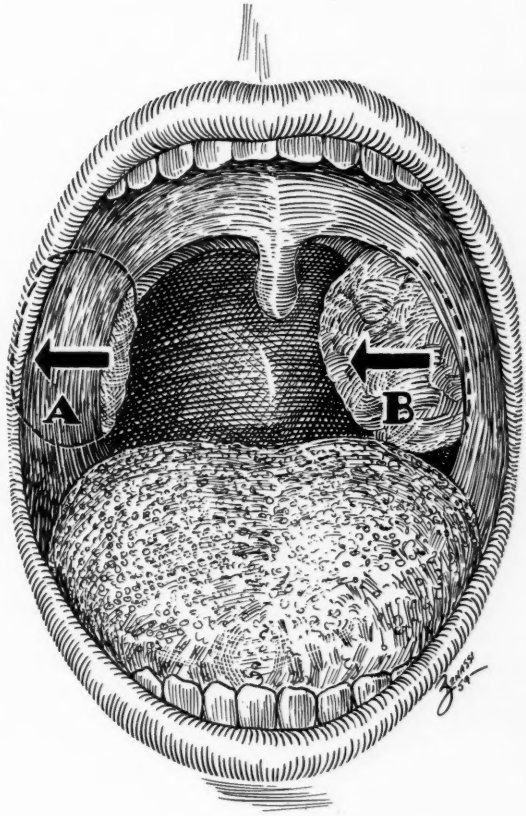

Fig. 1.

adenotonsillectomy, bilateral myringotomy, and removal of the tenacious mucoid matter usually found in the mid ears by spot suction, has restored normal hearing to these individuals. The committee on conservation of hearing of the Minnesota State Medical Association has emphasized the importance of thorough and complete adenoidectomy in these cases. Thorough adenoidectomy is possible only when a combination of direct inspection and finger palpation of the nasopharynx is used during the operation.

A minor indication for adenotonsillectomy is halitosis caused by retained insipissated debris in the crypts of the tonsils and adenoids. Halitosis can be a very important social and economic problem to an individual.

The last indication for adenotonsillectomy that I wish to mention is a common one. I believe that all of us here have seen youngsters who have marked mouth breathing, snoring, restlessness in sleep, irritability, hypochromic anemia, and who are underweight, undernourished, poor eaters, and backward in school, as the result of large tonsils and adenoids. It is very gratifying to the surgeon to hear the parents state that removal of tonsils and adenoids have made an entirely different and better person out of such a youngster.

In regard to contraindications to adenotonsillectomy, I do not believe there are any absolute contraindications, unless, possibly, a severe blood dyscrasia, such as proven hemophilia. The age factor is a relative contraindication. It is inadvisable to remove tonsils and adenoids in a youngster under three years of age, because if it is performed before this age, the lymphoid tissue is most apt to recur and because it is now known[3,4] that the tonsils and adenoids play an important role in the development of natural immunity in the early years of life. I would consider removal of tonsils and adenoids in a child under three years of age only if they are so large that the child is having extreme trouble swallowing and breathing and is having exceedingly frequent severe upper respiratory infections which do not respond to antibiotics or other conservative therapeutic measures. If adenotonsillectomy is performed in such a youngster, I believe the parents should be warned that no matter how thoroughly the tonsils and adenoids are removed, the child may have to have a secondary removal, particularly of nasopharyngeal lymphoid tissue, later on.

Other relative contraindications are presence of an acute respiratory infection; blood dyscrasias, as leukemia and purpura; cardiac decompensation; the period of convalescence after any debilitating disease, and proven enlarged thymus gland in the early years of life.

Lastly, epidemics of contagious or infectious diseases are a contraindication to adenotonsillectomy. It is in this category that I wish to discuss the relation of adenotonsillectomy to poliomyelitis. As stated in the introduction, physicians, surgeons and the lay public alike have been exposed to a great deal of literature and publicity regarding the possible danger of performing adenotonsillectomy during the so-called poliomyelitis season. Doubtless, we, as surgeons, have often postponed the operation more out of fear of being condemned by the public for performing the operation when any poliomyelitis is present in the community than by an actual fear that a danger does exist. This relation of adenotonsillectomy to poliomyelitis is still an unsolved problem in medicine. Surgeons have been, and are, faced with the question, "Should adenotonsillectomy be performed if there is any poliomyelitis in the community?" and, for that matter, "Should the operation be performed during the months when poliomyelitis is most likely to occur?" In an attempt to find some answers to these questions, I shall summarize some of the literature to date and try to reach some conclusions therefrom.

Some surgeons have had actual cases of children developing poliomyelitis within its incubation period following adenotonsillectomy, and yet Harkness[5] had an unique experience wherein he performed adenotonsillectomy very freely during the severe poliomyelitis epidemic in the Davenport, Iowa, area about twenty-five years ago. He did this on the recommendation of Rosenau, who at that time felt that the anaerobic streptococcus was responsible for poliomyelitis, and he performed this surgery particularly on children who had had possible contact with poliomyelitis. Among these numerous tonsillectomized children, Harkness did not have a single case develop poliomyelitis.

McNaught[6] of Stanford University has had a wide experience with the controversial tonsillectomy-poliomyelitis problem. In a personal communication he states that it should be stressed that there is no "poliomyelitis season" and indicated adenotonsillectomy should not be postponed because of the calendar. He does believe that the operation is contraindicated during a local epidemic of poliomyelitis.

It appears that most of the studies concerning the tonsillectomy-poliomyelitis problem have been of a statistical nature. Miller[7] surveyed the 1,229 cases of poliomyelitis which occurred in Los Angeles County in the epidemic year of 1949. His statistical analysis of these cases indicated no clinical or statistical significant deviation between the actual and the expected incidence of poliomyelitis developing in patients recently tonsillectomized, even in the months of July through October.

However, the results of other studies do not

agree with Miller's conclusions. Mills[8] has reviewed the literature on the tonsillectomy-poliomyelitis problem and found unmistakable evidence that the attack rate of bulbar poliomyelitis in many epidemics has been found to be significantly higher on recently tonsillectomized patients, and evidence is increasing that bulbar poliomyelitis, rather than the spinal form of the disease, is more likely to occur in patients tonsillectomized at any time than in those with tonsils intact. Mills concludes that adenotonsillectomy should not be performed during an epidemic.

In 1950, Cunning[9] surveyed 36,000 cases of poliomyelitis and 100,000 cases of tonsillectomy compiled over a four-year period. He could find no definite causal relation but he did conclude that adenotonsillectomy, or, for that matter, any elective operation, should not be performed during a poliomyelitis epidemic or any other epidemic, and conversely in the absence of an epidemic, adenotonsillectomy should not be postponed during the summer months merely because poliomyelitis is apt to occur at that time.

Pedersen[10] reviewed 492 cases of poliomyelitis hospitalized in San Francisco during 1941 to 1945. He found that there were almost twice as many deaths from poliomyelitis in patients with tonsils removed as there were in patients with tonsils present. He also found that there was a higher incidence of bulbar and bulbospinal type poliomyelitis in tonsillectomized patients than in nontonsillectomized patients, the ratio being two to one.

In a summary of our own memorable 1946 Minnesota poliomyelitis epidemic, it has been shown that 13 per cent of the bulbar cases had had some nose and throat surgery performed within two to three weeks before the onset of the illness. Such a history was not obtained in the spinal poliomyelitis cases.

A very comprehensive statistical study of the 1946 Minnesota epidemic was recently completed by Anderson[11] and Rondeau. They used 2,669 histories of poliomyelitis in their study. They found that for all age groups 71.4 per cent of the 535 bulbar cases gave a history of tonsillectomy as contrasted with 28.2 per cent of the 936 severe spinal cases. Their studies showed that "if a child who still had his tonsils *in situ* developed recognizable poliomyelitis, the chances were only one out of twelve that the infection would be bulbar, but, if the child had at some time had the tonsils removed, the chances of bulbar involvement were more than one out of three." Furthermore, it is apparent from their studies that the length of time after adenotonsillectomy is not a factor in the high percentage of bulbar infection in tonsillectomized poliomyelitis patients. These findings suggest that it is important that a suitable indication is present before adenotonsillectomy is performed. As an epidemiologist, Anderson suggests an explanation for the controversial results in other statistical studies by saying that the lack of bulbar cases in the particular areas of those other studies may be due to concentration of poliomyelitis in ages before tonsil removal.

Aycock[12] found that poliomyelitis occurring within thirty days after tonsillectomy is predominately bulbar. His studies show that post-tonsillectomy bulbar poliomyelitis occurs almost exclusively during epidemics of the disease, and the onset of symptoms nearly always occurs six to twenty-four days after operation, with the peak at fourteen to sixteen days.

These figures agree closely with the incubation period of poliomyelitis in general, suggesting that the virus may be introduced at the time of operation. Aycock has also pointed out that there are many other possible contributing factors as important as tonsillectomy in increasing the susceptibility to poliomyelitis, both as to frequency and severity. Some of these factors indicate and include pregnancy, over-exertion, inoculations for active immunization, and operations.

Other studies relative to the tonsillectomy-poliomyelitis problem have been experimental in nature. Faber[13] and his associates have found in their laboratories that in order consistently to produce poliomyelitis infection in a divided nerve, it is necessary to apply virus to the central cut end before it is sealed off by blood. They found, experimentally, that application of poliomyelitis virus to the pharynx of cynomolgus monkeys, followed by enucleation of the tonsils, was followed in 100 per cent of cases, after seven to ten days, by primary bulbar paralysis, accompanied less often by high spinal paralysis. They believe that this effect is probably due to introduction of virus into the innervations of the peritonsillar tissues, notably muscle.

In a second series of experiments on monkeys, they found that intrathalamic inoculation of poliomyelitis virus followed three days later by tonsillectomy was regularly followed within two

more days by bulbospinal paralysis, in which all levels of the cord were involved. They believe this effect probably indicates that trauma or physical stress of surgery increases the vulnerablility of nerve cells to infection already present in the central nervous system.

In a third series of experiments on monkeys they found that oropharyngeal swabbing with poliomyelitis virus and no tonsillectomy, spinal paralysis usually resulted, with bulbar manifestations in only one instance. In even a fourth series of experiments on six monkeys, they found that oropharyngeal application of poliomyelitis virus followed by oropharyngeal application of 2 per cent tincture of iodine and then by tonsillectomy, all six animals remained well.

Faber has tested a large number of virucidal agents and has found that 2 per cent tincture of iodine is still the best. On the basis of these experiments, McNaught has routinely swabbed the fauces and nasopharynx before adenotonsillectomy with 2 per cent tincture of iodine and has had no untoward reactions.

Adams[14] and his associates were able to confirm Faber's findings. They found that 20 per cent of monkeys fed poliomyelitis virus and tonsillectomized, subsequently developed bulbar poliomyelitis, whereas in the nonoperated control group of twenty monkeys, fed the same virus in an identical dosage, no poliomyelitis developed. It is encouraging to know that Adams[15] and his associates have found experimentally that the poliomyelitis attack rate in tonsillectomized monkeys fed poliomyelitis virus was 65 per cent, whereas in the animals which were fed poliomyelitis virus, then given human gamma globulin, and then tonsillectomized, the attack rate was only 12 per cent, and in nonoperated control animals fed poliomyelitis virus and given gamma globulin the rate was 13 per cent. Nine of ten operated monkeys given gamma globulin later resisted rechallenge with the poliomyelitis virus, suggesting that the monkeys acquired immunity.

In a personal communication,[16] Adams states that he and his associates were able to prevent poliomyelitis in monkeys fed poliomyelitis virus following tonsillectomy by giving human gamma globulin twenty-four hours prior to the feeding of the virus. In mice he and his associates showed that the time interval was very important, getting their greatest protection when they gave the gamma globulin four days prior to the inoculation of poliomyelitis virus.

What conclusions can then be drawn from these statistical and experimental studies in the poliomyelitis-tonsillectomy problem?

1. The weight of evidence favors the conclusion that if an individual has had a recent adenotonsillectomy and is exposed to poliomyelitis, his chances of developing bulbar poliomyelitis are greater than if he had not had surgery.

2. Adenotonsillectomy should not be performed if there is an epidemic of poliomyelitis in the community.

3. If the indication for adenotonsillectomy is definite and pressing, I believe the operation need not be deferred during the summer months if there is no poliomyelitis present in the community.

4. On the basis of experimental evidence, I believe it is advisable to give poliomyelitis human gamma globulin at least four days before adenotonsillectomy is performed during the months when poliomyelitis is most likely to occur. The gamma globulin should be given in the dosage of .2 cc. per pound of body weight.

5. Also on the basis of experimental evidence, I believe it is advisable to swab the oropharynx and nasopharynx with 2 per cent tincture of iodine just prior to adenotonsillectomy.

6. These precautions in the performance of adenotonsillectomy should prevail until unquestionable methods of preventing poliomyelitis exist.

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(Continued on Page 496)

Hemolytic Anemia

Diagnosis and Treatment

PAUL S. HAGEN, M.D.
Minneapolis, Minnesota

HEMOLYTIC anemia is rather common.[3] Increased awareness on the part of clinicians and the use of certain laboratory tests have made the diagnosis of excessive red cell destruction a frequent occurrence.

The size of the circulating red cell mass is fundamentally the net result of production and loss of red cells. Any anemia, therefore, has to result from decreased production, increased loss or combinations of these two factors. Loss of red cells occurs from two possible mechanisms, hemorrhage or destruction of red cells.

We are concerned here with the recognition and treatment of anemias due to an increased rate of destruction of red cells. The normal average life of erythrocytes is 100 to 120 days.[4] In hemolytic anemias the average life of the red cells is always reduced, sometimes to only a few days.

Cross-transfusion studies of serologically identifiable red cells have shown that the hemolytic anemias fall into two major categories.

Table I lists hemolytic anemias due to intrinsically defective cells. The familial hemolytic anemias are in this group.

TABLE I. HEMOLYTIC ANEMIAS DUE TO INTRINSICALLY DEFECTIVE RED CELLS

Hereditary Spheroidocytosis (familial hemolytic anemia, congenital hemolytic jaundice)
Abnormal Hemoglobins (Sickle (S), C, D, E)
Thalassemia ("Mediterranean")
Hereditary Non-Spheroidocytic
Paroxysmal Nocturnal Hemoglobinuria

The other major division includes the hemolytic anemias due to extrinsic or environmental factors. These constitute a large group caused by many different agents. Table II lists some of these agents. Anemias due to immune body reactions are the most frequently encountered.

"Idiopathic" acquired hemolytic anemia is in this group. Evidence of immune body reactions is often found in such patients.

TABLE II. HEMOLYTIC ANEMIAS DUE TO ABNORMAL ENVIRONMENT

Septicemia
Intracellular Parasites
Burns
Animal and Vegetable Poisons
Chemicals
Immune Body Reactions
Isoagglutinins related to the various blood groups including Rh sensitivities
Cold hemagglutinins
"Cold" and "Warm" hemolysins
"Idiopathic" Acquired
Symptomatic or Secondary
Lymphocytic Leukemia
Myelocytic Leukemia
Hodgkins Disease and other Lymphomas
Carcinomatosis
Hepatic Cirrhosis
Primary Atypical Pneumonia
Infectious Mononucleosis
"Felty's" Syndrome
Polyarteritis Nodosa
Salmonellosis
Uremia
Hyperthyroidism
Lupus Erythematosis
Sarcoidosis

An especially important type of acquired hemolytic anemia is symptomatic or secondary hemolytic anemia. In these patients the hemolytic anemia is associated with an underlying, primary disease. Table II includes a list of some of the diseases with which increased hemolysis has been found. Obviously, if the clinician is aware that increased red cell destruction can be related to these illnesses, he is more likely to make the proper diagnosis of the anemia.

Diagnosis

There are many leads to the diagnosis of hemolytic anemia. A family history of anemia may indicate a diagnosis of one of the congenital hemolytic syndromes. The possibility of exposure to industrial chemicals must be inquired into. A detailed history as to the ingestion of drugs, chemicals, or other poisons may be revealing. The large number of diseases with which

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From the Hematology Section, Medical Service, Minneapolis Veterans Administration Hospital and the Department of Medicine, University of Minnesota Medical School, Minneapolis, Minnesota.

hemolytic anemia has been associated must be kept in mind.

Certain observations during the course of a patient's illness may suggest the diagnosis of a hemolytic process. For example, if, without evidence of hemorrhage, the hemoglobin concentration falls faster than about 1 gm. per 100 ml. of blood per week, excessive hemolysis is likely. If a patient, without evidence of hemorrhage, requires transfusions of 500 ml. or more of blood per week to maintain a hemoglobin level, increased red cell destruction is probable. Again, when hemorrhage is not present, if 500 ml. of blood does not increase the hemoglobin by an average of about 1 gm. per 100 ml. of blood, abnormal hemolysis should be suspected.

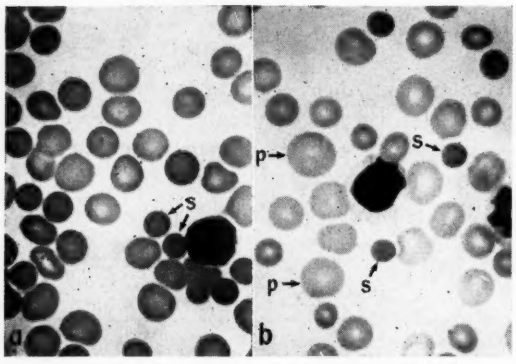

Fig. 1. s=spheroidocyte, p=polychromatophilic cell (these cells have a grayish-blue tinge and usually are larger than normal adult cells).

The presence of splenomegaly and/or jaundice in an anemic individual suggests that increased hemolysis may be present. It is important to realize, however, that hemolysis can be present with or without either of these signs. The presence or absence of jaundice depends simply upon the ability of the liver to excrete the bilirubin as rapidly as it is formed.

Several laboratory studies are helpful in the recognition of increased red cell destruction.

Examination of a stained film of peripheral blood may reveal spheroidocytes. Spheroidocytosis is highly suggestive of increased hemolysis.

Figure 1*a* shows spheroidocytes from a patient with hereditary spheroidocytosis, in which the cells are intrinsically defective.

Figure 1*b* shows spheroidocytosis in the blood of a patient with "idopathic" acquired hemolytic anemia. It is obvious that the pathogenesis of spheroidocytosis cannot be deduced from the morphology alone. This figure also illustrates polychromatophilia, a characteristic of young cells. Increased numbers of polychromatophilic cells indicate increased red cell regeneration. This finding, coupled with spheroidocytosis, is highly suggestive of an active hemolytic process.

Poikilocytosis is another sign associated with a shortened life of the red cell as, for example, in thalassemia. Sickle cells can occasionally be found in the ordinary stained blood film. Increased numbers of target cells may indicate the presence of certain short-lived cells.

Another helpful examination is the reticulocyte count. Normally 0.5 to 1.5 per cent of the circulating red cells stain supravitally as reticulocytes. Increased numbers of reticulocytes represent increased red cell regeneration. If blood loss and response to therapeutic agents can be ruled out, persistent reticulocytosis without a rise in hemoglobin generally suggests increased red cell destruction.

The osmotic fragility test is another aid in the diagnosis of hemolytic anemia. Because spheroidocytes rupture more easily than normal cells in hypotonic salt solutions, increased osmotic fragility demonstrates the presence of spheroidocytes and confirms the impression gained from examination of the peripheral blood smear. A simple 4-tube test can be performed in the office. Figure 2 shows increased osmotic fragility in such a test. The test blood was taken from a patient with hereditary spheroidocytosis two weeks after splenectomy.

The serum bilirubin is often increased in hemolytic anemia and exhibits a predominantly indirect or delayed direct Van den Bergh reaction. However, there may be even marked hemolysis without elevated serum bilirubin.

Since immune antibodies are present in many of the acquired hemolytic anemias, tests for antibodies should be made whenever hemolytic anemia is suspected. The demonstration of antibodies suggests that abnormal hemolysis is present. However, antibodies may be present without increased hemolysis, and increased hemolysis may occur without the demonstration of antibodies. Tests for antibodies include: the Coombs test (direct and indirect), trypsinated red cell test, cold agglutinin titer, Donath-Landsteiner reaction, special examinations for other "cold" hemolysins, and tests for "warm" hemolysins.

Other pertinent examinations include, at times, a sickle cell test performed with a chemical reducing substance, test for hemosiderinuria, and occasionally a bone marrow examination.

The discussion thus far has related to signs which suggest the presence of increased red cell destruction as a cause of anemia. Attention will now be given to diagnostic signs of increased red cell destruction.

The most unequivocal of these is the presence of hemoglobinemia and hemoglobinuria. Hemoglobinemia results from intravascular hemolysis. Hemoglobinuria occurs whenever the plasma hemoglobin level exceeds the renal threshold for hemoglobin. Hemoglobinemia is rarely seen in hemolytic anemia, because in most patients hemolysis is at a slower rate and apparently occurs "extravascularly." On the other hand, hemoglobinemia frequently occurs with severe transfusion reactions and certain septicemias. Patients with paroxysmal cold and paroxysmal nocturnal hemoglobinuria regularly show hemoglobinemia, but usually the diagnosis of increased hemolysis must be made on other evidence.

Another approach is to observe in a patient the fate of identifiable red cells. If the average life of the cells is shortened, an increased rate of destruction is present. These methods may utilize the naturally occurring agglutinogens of the red cells (A, B, M) or certain isotopic tags (Cr^{51}, N^{15}, C^{14}). At present, tagged cell techniques are research methods and are not feasible in general practice.

The most useful and practical means to diagnose an increased rate of red cell destruction is the quantitative determination of the average daily output of fecal urobilinogen in four-day stool collections.[10] Heavy nitrogen tracer studies have indicated there is more than one source of fecal urobilinogen.[8] However, from a clinical point of view, except in the case of pernicious anemia, an increased fecal urobilinogen indicates an increased rate of red cell breakdown. To be of most help, the fecal urobilinogen should be related to the circulating hemoglobin mass either as a "hemolytic index"[9] or an "apparent hemoglobin wastage"[11] figure.

The examination of random stool samples for Ehrlich reacting substances[12] leads to the same general conclusions as the more elaborate quantitative method.

It is important to realize when interpreting fecal urobilinogen values, that falsely normal results can occur. Antibiotics such as aureomycin, terramycin, erythromycin and neomycin given even in small doses can alter the intestinal flora so that the bilirubin is not converted to urobilinogen in the usual way. Constipation and diarrhea may lead to erroneous results. The sample should weigh at least 300 gm. to be considered an adequate four-day stool specimen.

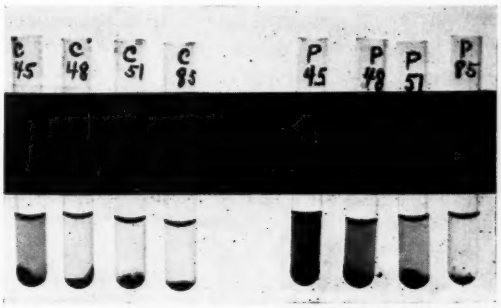

Fig. 2. C=control, normal blood. P=patient's blood. Numerals denote NaCl solution, e.g., 45=0.45 per cent NaCl.

The test is a slight modification of the screening test outlined by Ham.[6] One tenth ml. of blood (collected by syringe and mixed with double oxalate[7]) was added to 1 ml. of each saline solution. The tubes were inverted three times, centrifuged 10 minutes and read. We have used the four solutions as illustrated. However, the 0.51 per cent NaCl is critical. In eighty-five control tests* no hemolysis was visible in the 0.51 per cent NaCl, but 15 per cent showed some hemolysis in the 0.48 per cent and all hemolyzed in the 0.45 per cent NaCl.

*With the technical assistance of Mrs. Patricia Shelander.

There may be enough variability of fecal urobilinogen excretion to require serial examinations for proper evaluation of the rate of red cell breakdown.

Treatment

Since increased erythrocyte destruction may arise from a variety of causes, rational therapy demands that the pathogenesis of excessive hemolysis be diagnosed accurately.

When an infectious or parasitic disease is the cause, appropriate specific therapy should be given. In the case of most toxic agents there is no specific treatment.

In patients with symptomatic hemolytic anemias, treatment directed at the primary diseases may prove fruitful. For example, x-ray treatment in leukemia or lymphoma rarely may decrease the rate of hemolysis.

Otherwise, the available therapeutic measures

for hemolytic anemia consist mainly of blood transfusions, ACTH and cortisone, and splenectomy.

Blood transfusions are the mainstay of supportive therapy. However, there is greater danger of transfusion reactions, especially in the patients with hyperimmune states. Each unit of blood introduces about 250 mg. of iron into the patient to add to the hemosiderosis usually present in chronic hemolytic anemia. To limit the number of transfusions it is best not to attempt to keep the hemoglobin level above 10 gm. per 100 ml. of blood.

ACTH and cortisone are used in acquired hemolytic anemia particularly when a hyperimmune mechanism has been demonstrated. The rationale is based upon the hope that ACTH or cortisone will interfere with the antigen-antibody reactions believed to exist in these hemolytic anemias. Results are not constant.[1] However, if there are no contraindications, it appears worth while to try either of these agents in immunohemolytic disease before splenectomy is undertaken, at least as a means of improving the preoperative status.

The results of splenectomy are variable. Splenectomy is effective nearly 100 per cent of the time only in hereditary spheroidocytosis. There has been no notable success in the other anemias due to intrinsically defective red cells, unless there has been a complicating acquired hemolytic component. In acquired hemolytic anemia, whenever the spleen is large and the hemolytic process fulminating, splenectomy may give dramatic results. Often, however, there is no real response. In certain selected patients with leukemia or lymphoma, in whom excessive hemolysis is the immediate problem, splenectomy is often helpful[2,5]

The course of acquired hemolytic anemia is often characterized by remissions and exacerbations, making it difficult, at times, to evaluate the results of therapy.

In conclusion, we will briefly summarize the courses of two patients to illustrate some of the problems of treatment.

Case Reports

Case 1.—The patient was a thirty-four-year-old man who had Hodgkin's disease complicated by hemolytic anemia.[4] He had fever, splenomegaly, leukopenia and thrombocytopenia.

Figure 3 shows the results of survival studies of transfused normal red cells in the patient before and during treatment with cortisone. The Ashby differential agglutination technique was used to determine the average red cell life. Cortisone in an average dose of 150 mg. per day was given for sixty-two days. There

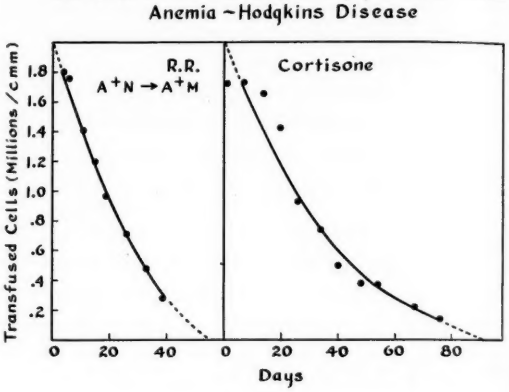

Fig. 3. In each study the test cells were followed by the Ashby differential agglutination technique.[13]

was clinical improvement with abatement of the fever. The hemoglobin rose from an average of 10 to 13.6 gm. per 100 ml. of blood, reticulocytosis decreased from 8.5 to 3.8 per cent, and the average fecal urobilinogen decreased from 897 to 559 mg. per day. It can be seen that there was also some improvement in the survival of transfused red cells, but the survival was still far from normal.

The patient was given ACTH or cortisone for most of the ensuing seventeen months, but he required an average of 432 ml. of blood per week to maintain an average hemoglobin level of about 9.8 gm. per 100 ml. of blood. Splenectomy was then done in the hope of decreasing the transfusion requirement and improving the persistently low leukocyte and platelet counts. The spleen weighed 3475 gm. The transfusion requirement was reduced to an average of 288 ml. per week for the ensuing forty-three weeks. There was also improvement in the white blood cell and platelet counts.

Case 2.—The patient was a thirty-eight-year-old man who had "idiopathic" acquired hemolytic anemia. Survival of the patient's own cells was studied in September, 1953 (Fig. 4), using radiochromium to mark the test cells. The tagged cells disappeared rather rapidly. During this time the average fecal urobilinogen was 1068 mg. per day. At the end of this study there was a marked exacerbation of the hemolytic process. The Coombs test became positive, the hemoglobin fell to 5.3 gm. per 100 ml. of blood, and there was a reticulocytosis of 23.2 per cent. The fecal uroblinogen increased to 2407 mg. per day. He was given ACTH, 80 mg. per day for twenty days. The hemoglobin rose to 8.5 gm., the reticulocytosis decreased to 5 per cent and the fecal urobilinogen fell to 686 mg. per day. Splenectomy was

then performed. The spleen weighed 480 gm. ACTH was discontinued. There was improvement in the hemoglobin to as high as 14.2 gm. per 100 ml. of blood. However, the positive Coombs test persisted and there was macroscopic cold agglutination. Restudy of cell survival in February, 1954, showed some improvement, but increased red cell destruction persisted. During this period of observation, average values were as follows: Hemoglobin, 13.2 gm. per 100 ml. of blood; reticulocytes, 3.5 per cent, and fecal urobilinogen, 428 mg. per day.

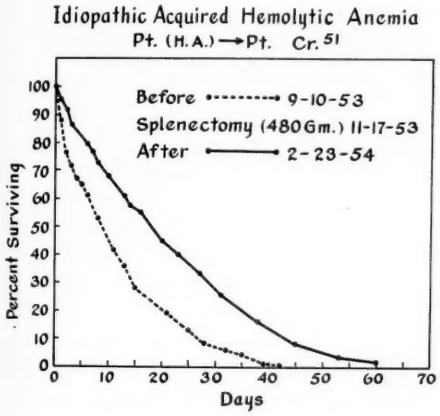

Fig. 4. In each study an aliquot of the patient's blood was incubated at room temperature for 1 hour with radioactive Na_2CrO_4 solution. The red cells were washed with physiologic saline and injected into the patient. A well type scintillation counter was used to measure the radioactivity of serial blood samples. The counts were corrected for radioactivity decay and variations in hematocrit and expressed as per cent of the count of the initial sample.

Summary

1. The diagnosis and management of hemolytic anemia are discussed.

2. Two cases of hemolytic anemia are presented.

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DIGITALIS THERAPY AND DIGITALIS INTOXICATION

Properly used, digitalis is the most valuable agent in the management of congestive heart failure. It is also helpful in the therapy of many cardiac arrhythmias. When used improperly or when actually contraindicated, it may cause serious intoxication, cardiac arrhythmias and even death. Congestive heart failure, regardless of its etiology, is the primary indication for digitalis therapy. The only absolute contraindication is the presence of digitalis intoxication or the presence of full digitalization.

There are many digitalis preparations in use, and each has its own clinical advantages. For rapid oral digitalization digitoxin is preferred. Whole leaf preparations are used for slow digitalization. Lanatoside C, digoxin and gitalin are effective when rapid intravenous digitalization is indicated.

Whole leaf preparations are used chiefly for maintenance therapy where there is no urgency in establishing full digitalization. Digoxin is rapidly excreted, hence it can approach toxicity to obtain full digitalization. Gitalin has been suggested as the preparation of choice by Batterman and co-workers because the therapeutic dose is only one-third of the toxic dose, hence there is a wider margin of safety with this drug. Moreover, in advanced heart disease, gitalin may be useful when other preparations have failed because of toxicity. Its rate of excretion falls between the rapid rate of digoxin and the slow rate of digitoxin.

There is no "average" dose of any preparation that will digitalize or maintain every patient. Each patient must be managed on trial-and-error basis by careful observation.—R. M. DENHAM, *J. Kentucky St. Med. Assn.*, 53:209 (March) 1955.

Cancer of the Thyroid

Fifteen-Year Study in Duluth

KENNETH A. STORSTEEN, M.D., and THOMAS O. YOUNG, M.D.
Duluth, Minnesota

THE literature is replete with many excellent articles dealing with thyroid cancer. The largest series of cases in this country are reported from the major medical clinics, but they do not always get a representative cross section of a given pathologic entity. Then, too, it is always interesting and instructive to review the pathologic material in your own community. Therefore, we have made a study of this subject in Duluth.

There have been, and still are, many problems concerning thyroid cancer. Some of them are: what constitutes malignancy, classification of thyroid neoplasms, lateral aberrant thyroid, treatment by surgery including the place of radical neck dissection, treatment with radiation and radioactive iodine. Some of these problems have been resolved but most of them are still subject to difference of opinion.

TABLE I. INCIDENCE OF THYROID CANCER IN SURGICALLY TREATED GOITERS FROM 1938 TO 1953 IN DULUTH, MINNESOTA

Diagnosis	*Cases*	*Cases in Which Carcinoma Was Present*	
		Number	*Per Cent*
1. All surgical goiters	1,485	42	3
2. Diffuse toxic goiter	327	0	0
3. Toxic nodular goiter	353	3	1
4. Nodular goiter	1,073	42	4
5. Nontoxic nodular goiter	720	39	6

Incidence

Cancer of the thyroid is uncommon. According to Hendrick, it makes up 1 per cent of all human cancer. Autopsy figures are not accurate because autopsies are done on a select group of people, the thyroid is not always examined, and if inspected it is often examined only grossly. Furthermore, many patients dying of thyroid cancer do not die in the hospital.[6] Surgical figures of incidence are probably not entirely accurate either as they represent a select group of patients.

From 1938 to 1953 there were 1,485 surgically treated goiters in the three Duluth hospitals. Among the series are forty-two patients who had cancer of the thyroid, an incidence of 3 per cent. There were no cancers in the diffuse toxic goiters. There were three cancers in toxic nodular goiters. The incidence of malignant disease to nodular goiter treated surgically was 4 per cent. These figures on the incidence of thyroid cancer are slightly lower than others published for the Great Lakes area.[2,6]

In the Great Lakes area, where there is such a high incidence of multinodular goiters, it is very difficult clinically to distinguish between single and multiple nodular goiters, especially in the age group over forty. We did not separate our nodular goiters into single and multiple groups.

Materials and Methods

This report is based on fifty-six patients with thyroid cancer studied in the three Duluth hospitals during the years 1938 to 1953 inclusive. They were distributed as shown in Table II.

TABLE II. CANCER OF THE THYROID IN DULUTH YEARS 1938 TO 1953

St. Luke's Hospital	31 patients
St. Mary's Hospital	20 patients
Miller Hospital	5 patients
Surgical material	43 patients
Autopsy material	3 patients
Clinical diagnosis or those patients where tissue not obtainable	10 patients

The histologic material from forty-six of these patients has been reviewed and a simplified histological grouping devised. All of the Duluth pathologists were very helpful in the re-examination of the pathologic material.

Generally speaking, there are two main types of thyroid cancer, the differentiated and the undifferentiated. The differentiated group is of relatively low grade malignancy and occurs predominantly in young people. The undifferentiated

Presented to the Duluth Surgical Society, March 25, 1954.

cancers are highly malignant and are found chiefly in the over fifty age group.

The following table is a modification of Shields Warren's most recent classification. Although the classification is not ideal, it is based on a correlation of histologic structure with clinical course and attempts to indicate which tumors will be sensitive to I^{131}.

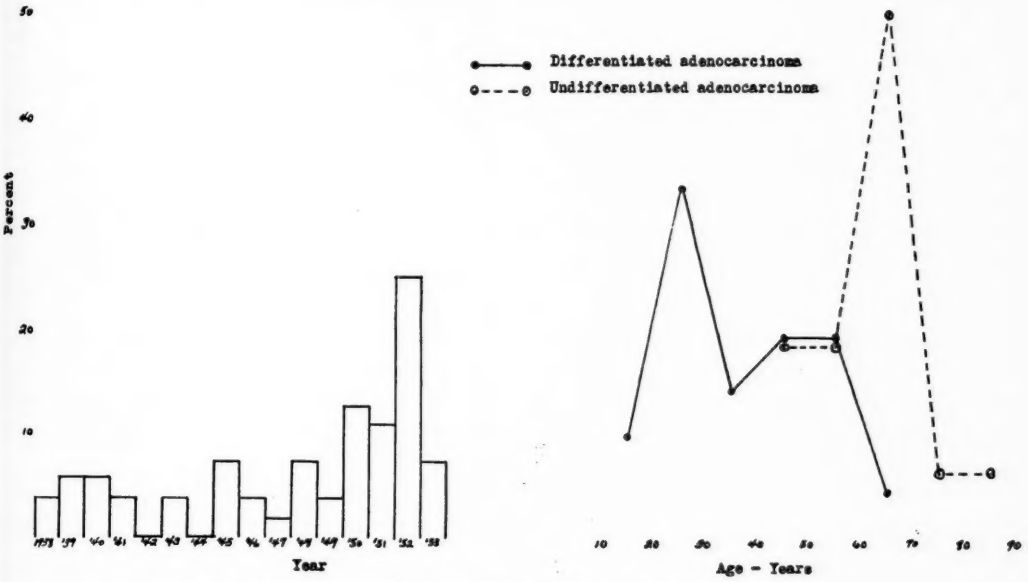

Fig. 1. Occurrence of thyroid cancer in Duluth by year and age groups.

TABLE III. FORTY-SIX PATIENTS WITH CANCER OF THE THYROID IN DULUTH

	Patients	Primary Carcinoma Per Cent	Response to I^{131}
A. Differentiated			
1. Papillary adenocarcinoma	10	41	poor
2. Mixed papillary and follicular adenocarcinoma	7		fair
3. Follicular and alveolar adenocarcinoma	4	10	good
B. Undifferentiated			
1. Giant cell carcinoma	14	38	none
2. Small cell carcinoma	2		none
C. Miscellaneous			
1. Hurthle cell carcinoma	4	10	poor
2. Lymphosarcoma	1	2	none
3. Secondary tumors	4		none
4. Squamous cell carcinoma			none
5. Fibrosarcoma			none

The papillary and mixed papillary and follicular adenocarcinoma are grouped together because they are clinically similar in their behavior, the main difference being that the mixed one has more affinity for I^{131}. Our incidence of papillary adenocarcinoma (41 per cent) is somewhat less than the presently quoted figures by other authors.[2,9] Our incidence of undifferentiated adenocarcinomas is also somewhat more than in these recent statistics. Papillary adenocarcinoma usually constitutes 60 per cent and undifferentiated carcinoma 20 per cent of primary thyroid cancer. The information in the column response to I^{131} was obtained chiefly from personal observations and from the literature; not from data in this study.

In Figure 1 it can be seen that there has been a decided increase in the number of thyroid neoplasms recorded during the past four years. The cause of this increase is not readily apparent. Most of this increase is in the differentiated type, that is, the papillary and follicular carcinomas. Crile et al state that in recent years, patients with papillary carcinoma are operated upon oftener and earlier and many patients formerly lived their natural lives with low-grade carcinoma. Another thought is that some of the previously pathologically diagnosed adenomas were adequately excised surgically and were actually carcinomas.

Of the differentiated neoplasms 75 per cent were in patients under age fifty; while eighty per cent of the undifferentiated cancers were over age fifty (Fig. 1).

The sex ratio of thyroid malignancy favored the female in a ratio of 3.5 to 1. However, when considering the differentiated tumors separately,

the female preponderance jumped to 9 to 1 and in the undifferentiated group the ratio was practically 1 to 1.

Major Types of Primary Thyroid Cancer

The clinical, pathological and surgical picture of the major types of primary thyroid cancer are so varied that they will be considered separately.

It was possible to make a five-year follow-up study in only about 45 per cent of our cancer patients. Consequently, survival rates will not be stressed in this paper. Furthermore, we believe that the five-year survival rates as a criterion of cure in some forms of thyroid cancer are of limited value.

Papillary Adenocarcinoma
(41 Per Cent) 17 Cases

Papillary adenocarcinomas make up the largest histologic group in most reported series and it also constituted our largest single group. However, in our study the preponderance of papillary tumors was not found. The age range in our series with this tumor was from seventeen to sixty-four years of age. The carcinomas were most frequent during the third and fourth decades, the median age being thirty-two years. It might be noted at this time that this is the characteristic thyroid cancer of youth and childhood. The sex ratio was 7:1 in favor of the female. The predominant symptom or sign was the presence of a lump. The duration of goiter varied from a few weeks to twenty years.

Physical Findings.—The lump was often of small size. A single discrete thyroid nodule was palpable in 75 per cent of cases. Two cases showed palpable cervical lymph nodes on admission and these were both called lateral aberrant thyroid tumors both clinically and pathologically.

Clinical Course.—Papillary tumors are the least malignant of all thyroid cancers and often have an extremely prolonged clinical course. In this series of patients with papillary tumors, only one is dead of this disease, but another is living two years after surgery with pulmonary metastasis. The rest are living and well without evidence of recurrence.

It is to be noted that malignancy was suspected in only three cases (18 per cent) and one of these died. The cause of death in this case was widespread metastasis via the blood stream to the brain, kidney and liver.

Papillary tumors are notorious lymphatic metastasizers, but the only two instances recorded of this phenomenon are in the two cases of so-called lateral aberrant thyroid. They are interesting and will be discussed later.

Results of Treatment.—Adequate surgical removal is the best treatment and the results are good. Radiation therapy is of questionable value. In our series, five patients had Roentgen therapy; one of these died, and the other four received questionable benefit. I^{131} was used also in the patient that died, and since histologically the tumor contained no thyroid follicles it is doubtful if there was any uptake of I^{131}.

Evaluation of radical neck dissection cannot be made at present since this approach to treatment has not been in effect for sufficient time and there have not been enough patients treated this way in our study.

Follicular and Alveolar Adenocarcinoma
(10 Per Cent) 4 Cases

The clinical and pathological characteristics of these tumors are very similar to the papillary group just described except that they are more likely to spread by the blood stream,[12] and they have a relatively good uptake of I^{131}. Spread by lymphatics does not occur until the capsule of the adenoma is transgressed.[3] All patients in this group are living but one has a local recurrence and has a tracheotomy. Nevertheless, this patient must be classed as a ten-year survival.

Undifferentiated Adenocarcinoma
(38 Per Cent) 16 Cases

In contrast to the differentiated carcinomas, the median age for this group was sixty-one years. The youngest patient was forty-two and the oldest eighty-four. The sex ratio was practically 1:1. The striking feature of the clinical picture in these patients was the story of a rapidly enlarging painful mass in the neck, and often dyspnea, hoarseness and dysphagia. These late symptoms of thyroid malignancy were present in over 50 per cent of cases.

Physical Findings.—The mass was often of bulky proportions, in contrast to the differentiated new growths, and fixation to adjacent structures was common.

Clinical Course.—Rapid progression of the disease was the outstanding characteristic. Death was often due to local metastasis causing obstruction of the trachea, esophagus or both. Visceral metastasis did occur, but death usually intervened before this complication became significant. All but one of these sixteen patients are dead. The one living is now nineteen months postoperative following a radical neck dissection and radiation therapy. However, he is in the terminal stage of his disease now with local recurrence and tracheotomy. Another patient survived two and one-fourth years after surgery and died of tracheal and esophageal obstruction. The other fourteen patients (87 per cent) had a mean postoperative survival period of only three months; and the mean duration of life from onset of symptoms to death was about seven months. In no other form of human cancer is such a lethal outcome so inevitable.

Since blood stream and lymphatic metastasis, as well as local invasion of adjoining structure are the rule in this condition, it is not unusual that widespread visceral and bony metastasis were found in autopsy cases.

Results of Treatment.—As indicated in the preceding paragraphs, the results of treatment were most discouraging. Surgical excision with hope of cure was attempted in only five patients or 31 per cent. Radical surgery was done in two patients; one of these died six months postoperative and the other is living with an extensive recurrence nineteen months postoperative.

The response to radiation therapy and I^{131} was uniformly negligible.

Hurthle Cell Carcinomas

(10 Per Cent) 4 Cases

The Hurthle cell carcinoma is a specific histologic entity whose tumor cells resemble the parenchymatous cells of the liver. Microscopically these cancers rarely offered a problem in diagnosis except that there were areas of Hurthle cells in two of our papillary adenocarcinomas. The median age was forty-four, with a range of thirty-eight to fifty-seven years. All of our cases were in women. These patients gave a history of a lump; 50 per cent had dysphagia. There is no agreement in the literature regarding the histogenesis of Hurthle cell tumors.

End Results.—It would seem that these cancers are intermediate in their malignant potential between the differentiated and the undifferentiated tumors. They metastasize first by blood stream and later by lymphatics.[11] One of our patients died six months postoperative; another patient is a ten-year survival but has pulmonary metastasis and has had a metastatic lesion of the brain removed on two occasions. The other two patients are living and well.

The treatment is surgical excision; radiation therapy and I^{131} are of littlle vaue.[11,15]

Lymphosarcoma

(2 Per Cent) 1 Case

The histopathologic diagnosis is sometimes difficult. It must be differentiated from small cell carcinoma and Hashimoto's thyroiditis. Our only case of lymphosarcoma reacted in a virulent manner similar to the undifferentiated tumors. Although this tumor is considered radiosensitive, good results are rarely obtained by roentgen therapy.[10]

Relation of Cancer to Hyperthyroidism

Cancer of the thyroid is rare in hyperthyroidism but one should be cognizant of its possibility. Beahrs et al[1] found an incidence of cancer in cases of exophthalmic goiter of 0.5 per cent, but we had no patients in our series. We did have three cases of cancer in toxic nodular goiters.

Relation of Cancer to Previous Goiter

Approximately 20 per cent of our thyroid cancer patients had a goiter for five or more years. The cancer was considered inoperable on clinical examination or at the time of exploratory operation in twenty-six cases or 47 per cent of the total group. This leaves twenty-nine cases (53 per cent) which were treated surgically with hope of cure. Would removal of these pre-existing goiters have prevented the development of carcinoma or permitted removal of cancers before they were inoperable? Since there is no good way of diagnosing curable thyroid cancer short of histologic examination of tissue and since the mortality and morbidity in experienced hands is very low, we feel that at the present time we are justified in operating upon most nodular goiters.

Preoperative Diagnosis

Cancer of the thyroid gland should be seriously considered under the following circumstances: a

single discrete thyroid nodule, cervical lymphadenopathy with goiter, a firm Delphian node, a rapidly appearing or recently enlarging goiter, a very firm thyroid nodule or a relatively fixed thyroid gland, and hoarseness associated with goiter.

Of our surgical cases, malignancy was suspected in 41 per cent. But what was the end result of these cases where malignancy was suspected? Eighty-eight per cent were dead or had a recurrence of their cancer. Thus, if you wait to operate upon those goiters where you suspect cancer, you will have discouraging results. The greatest salvage will be obtained by surgically excising nodular goiter.

Furthermore in our series, 45 per cent of the cancers were in multiple nodular goiters and 55 per cent were found in the single discrete nodule. Therefore, you cannot dismiss the possibility of cancer in multiple nodular goiters, especially in the Great Lakes area. However, papillary cancer was found in a discrete nodule in 75 per cent of cases.

The preoperative differential diagnosis of thyroid malignancy includes hemorrhage into an adenoma, calcification in an adenoma, other cervical tumors and the various types of chronic thyroiditis.

Surgical Treatment

Treatment of the Primary Lesion.—We do not believe that biopsy of the thyroid should be done, except in the inoperable cases or where it is impossible to tell if a lesion is thyroiditis or carcinoma. Nodules of the thyroid should also be removed unruptured. In both instances, implantation of malignant cells may occur if the nodule is broken into.

All thyroid malignancies should not be treated alike. The management of a given patient with cancer is dependent upon the histologic type of malignancy and the extent of local or distant metastasis. If carcinoma of the thyroid is strongly suspected, primary total lobectomy and removal of the isthmus should be done.

If subtotal lobectomy or excision of a discrete nodule has been done, the surgeon should examine the cut section of the tissue grossly. If fresh frozen section examination by the pathologist discloses cancer, the procedure should be completed as a total lobectomy and removal of the isthmus.

When carcinoma of both lobes is found, total thyroidectomy is indicated.

When there is true fixation of the cancer to adjoining structures as so often occurs in the undifferentiated type of malignancy, the salvage from total thyroidectomy alone or associated with radical neck dissection is so low that these procedures are not justified. Other deterring factors to these surgical procedures are the increased operative mortality and the subsequent morbidity of the patient.

Treatment of Lymphatic and Vascular Spread.—Cope has emphasized the importance of looking for the Delphian node both preoperatively and at surgery. A tumor in the isthmus may give bilateral cervical metastasis.

Radical neck dissection is rarely indicated except for some cases of papillary adenocarcinoma.

The *undifferentiated carcinomas* are rarely operable and it is only the occasional case where a radical neck dissection would be indicated.

Follicular and alveolar neoplasms metastasize by blood vessels first and by lymphatics only after the capsule is permeated.[3] Occasionally these tumors show vein tumor thrombosis and if the lesion is otherwise resectable, the involved veins are resected along with the tumor. Limited excision of involved nodes is sometimes indicated; radical neck dissection is not advised.

The greatest controversy concerns radical neck dissection for papillary adenocarcinoma. If no lymph nodes are clinically palpable, we believe that prophylactic neck dissection is not necessary. If one or a few lymph nodes are involved, then these nodes should be excised in groups surrounded with their envelopes of fatty areolar tissue. This more limited excision may be accomplished successfully at secondary and tertiary operations for cervical lymph node metastasis if necessary. If there is extensive cervical lymph node involvement, then a radical neck dissection is indicated.

Cattell and Hendrick favor radical neck dissection for all papillary adenocarcinomas while Crile, Black, and Beahrs are against it.

Crile states that the standard radical neck dissection is inadequate for papillary carcinoma because it does not get the lymph nodes that are most commonly involved. He also states that "if the gross tumor is removed completely, metastasis or recurrence are not observed." He further says that

"yet today, many patients are subjected to the most mutilating surgical dissections and what remains of their necks is treated with tremendous doses of roentgen rays. I believe that this needless mutilation in this group of papillary tumors causes more disability than it has prevented." Why is local excision of lymph nodes adequate in most papillary carcinomas of the thyroid?

1. The tumors are slow growing, they remain confined to the neck for many years. Spread beyond the capsule of an involved node is delayed and unusual.

2. Metastasis is embolic and not by permeation; therefore *en bloc* dissection is not necessary.

3. Black found only a 38 per cent lymph node involvement in 112 consecutive cases of papillary adenocarcinoma. Two thirds of these cases with nodal involvement had only one to four nodes with cancer. None of the inoperable cases in Black's study were inoperable solely because metastatic nodes could not be removed.

4. The metastasis that kill are usually blood borne and not lymphatic.

5. Metastatic nodes can be handled by local excision at the first, second or third recurrence, and the patient be cured of his disease. Beahrs reported a five-year survival of these tumors of 89 per cent and a ten-year survival of 82 per cent. It is doubtful if the benefit gained from radical neck dissections will be worth while.

McCorkle et al are extending the operation for thyroid cancer by splitting the sternum and doing a complete superior mediastinal dissection.

The final answer on radical neck dissection and other radical operations must await at least a ten-year follow-up of a sufficient number of cases.

Radiation and I^{131} therapy will not be discussed critically. However, suffice it to say that roentgen therapy is of some effect locally in the more anaplastic forms. Some authorities believe roentgen therapy is worth while; others do not.

I^{131} is probably of use in only 5 to 10 per cent of thyroid neoplasms, that is, in those composed chiefly of colloid filled follicles. Total thyroidectomy and thiouracil have been used in an effort to stimulate uptake of I^{131} in metastatic lesions.

Selected Case Reports

Case 1.—A twenty-seven-year-old white woman first consulted her doctor in November, 1945, because of a slowly enlarging nodule in the right side of her neck of many years' duration. She also complained of an occasional tight feeling in the right cervical region. Surgical exploration at this time was made through a vertical incision along the anterior border of the right sternocleidomastoid muscle. A tumor mass about 3 to 4 cm. in diameter was found at the level of the larynx. It was firm and freely movable and well encapsulated. It was excised together with three adjacent nodes.

The pathologic diagnosis was lateral aberrant thyroid. Her convalescence was uneventful. In July, 1952, or seven years later, she came to our office stating that her physician had told her one year previously that she had a recurrence of her goiter on the right side. She volunteered that it had enlarged slightly the past year and complained of a moderate feeling of pressure on the right but no difficulty in swallowing. There were no symptoms or signs of hyperthyroidism. Examination of her neck revealed a very firm nodule on the right about 3 to 4 cm. in diameter. The basal metabolic rate was —4.

Exploration of the thyroid was accomplished through the usual transverse collar incision. The right lobe appeared to be about twice normal size and was very firm and fibrous. A specimen was sent to the laboratory for frozen section and was reported grade I adenocarcinoma. It was felt that total right lobectomy should be done. As the gland was elevated it was found to extend retrotracheal to the point where the extreme left border of the right lobe lay behind the left lobe which was normal. Total right lobectomy was done with some difficulty.

The final pathologic diagnosis was adenocarcinoma of the thyroid, grade II.

Her convalescence was uneventful. Radiation therapy was started while the patient was still hospitalized. She has remained well to date. Because of the diagnosis of adenocarcinoma, interest was aroused in the sections from the previous cervical operation where the diagnosis was aberrant thyroid. Re-examination of these slides by the pathologist were reported as follows: "In view of the increased knowledge of thyroid tumors the original specimens would now be called adenocarcinoma."

Case 2.—A seventeen-year-old white boy consulted his physician in Duluth in 1950 because of a lump in the right side of the neck of four weeks' duration. Examination revealed a large spherical mass in the right supraclavicular area that was freely movable.

In November, 1950, a lateral aberrant thryoid measuring about 8 by 10 cm. in size was removed in a Duluth hospital.

Three months later, at the Mayo Clinic, a right total lobectomy with removal of the isthmus and pyramidal lobe was done. The primary thyroid cancer was only 1 cm. in diameter and located in the pyramidal lobe.

Seven months later, in September, 1951, a group of three cancerous lymph nodes were removed from the posterior triangle of the right neck.

Five months later a portion of the hyoid bone and a group of four submental nodes were removed. Carcinoma was present in the removed tissue.

There has been no evidence of recurrence at the last

two examinations one and one-half years after the last operation.

All pathologic tissue removed showed mixed papillary and follicular adenocarcinoma, grade I and at the last operation an autoradiograph of the carcinomatous tissue removed showed fairly good uptake of I^{131}.

There is now general agreement that the so-called lateral aberrant thyroid is metastatic carcinonma of the thyroid, and the primary site will be found in 100 per cent of cases in the parent organ if careful search is made.

These two patients are well without evidence of recurrence three and nine years after the first operation. The follow-up is probably not long enough but these case histories suggest that adequate excision of the primary lesion plus local excision of metastatic cervical lymph nodes is sufficient for cure.

Case 3.—This patient, a fifty-seven-year-old white woman, is of interest because there were two distinct malignancies at the same time in her thyroid gland. In the right lobe was a grade IV large cell carcinoma and in the left lobe was a grade II alveolar and follicular carcinoma.

Case 4.—A thirty-eight-year-old white woman was first seen by one of us in August, 1939, because of a goiter the past four years and rapid growth during the past two to three months. She also complained of nervousness, excitability and irritability.

She cried easily, perspired freely and was intolerant to heat. Slight exertion caused tachycardia and dyspnea. Her strength was poor and she had lost 20 pounds in weight the past four months.

Physical examination revealed an anxious, nervous woman with a fine tremor of both hands. The blood pressure was 140/70 and the pulse 90. The thyroid gland was markedly enlarged on the right, measuring 7 by 4 inches, and extended into the isthmus. The basal metabolic rate was +24.

At operation a large single adenoma firmly adherent to surrounding structures and involving practically all of the right lobe and isthmus was removed. The left lobe was carefully explored and found to be entirely normal.

The thyroid mass removed weighed 180 grams and histologic examination was reported as carcinoma of the thyroid.

Her convalescence was uneventful. During September and October she was given roentgen therapy. Following this she lived a normal life for ten years until a mobile unit chest roentgenogram in April, 1950, showed a nodular infiltration in the right lower lung. Follow-up roentgenograms over a period of time revealed the lesions to be growing slowly. Metastatic malignancy from the thyroid was considered the probable cause. It was felt that the lesions had progressed too far for pulmonary resection.

In August, 1950, she was referred to the University Hospital for treatment with I^{131} in the hope that the nodules were sufficiently differentiated to show adequate uptake of radio-iodine. Metastatic nodules were now present in both lungs. A tracer done of I^{131} showed 17 per cent uptake in the left lobe of the thyroid. In August, 1950, 50 millicuries of I^{131} were given to destroy the remaining normal thyroid tissue if possible. This was followed by 75 millicuries in December.

In May, 1951, a tracer dose of I^{131} showed no uptake in the lungs. In the meantime, serial chest roentgenograms revealed a slowly progressing increase in the size and number of the metastatic nodules in both lungs.

In March, 1952, she came to the office stating that two weeks ago she became forgetful, could not think clearly and was unable to comprehend printed words. She was hospitalized in April and her condition deteriorated rapidly. She was completely aphasic, very lethargic and quite oblivious to her surroundings. There was a hemianesthesia and hemiplegia present. A ventriculogram of the brain showed a large cystic tumor, rounded in shape, in the posterior parietal and anterior occipital region. Because the tumor had proved to be extremely slow growing, Dr. Strewler did a craniotomy in April, 1952. The cystic area contained thick yellow fluid and there was a firm nodule 2.5 cm. in diameter which was excised with the cyst wall.

The pathologic report of removed tissue was metastatic Hurthle cell adenocarcinoma of the thyroid.

Her convalescence was uneventful and she again lived a normal life until December, 1953. She now complained of headaches for three to four weeks that were becoming progressively more severe. There was also occasional nausea and vomiting, vertigo, confusion, and difficulty naming objects. She was hospitalized and a cerebral ventriculogram again revealed a large mass 5 to 6 cm. in diameter, lying in the temporo-occipital lobe and extending upwards into the parietal lobe.

It appeared to be well demarcated and was removed as completely as possible. Histopathologic examination again showed metastatic Hurthle cell carcinoma. After the tracer dose of I^{131} showed no uptake, she was started on thyroid extract, grains 1, three times a day. She also had intramuscular Testosterone Propionate, 100 mg. three times a week. Because of its virilizing effects, this was changed to Neodrol, 100 mg. twice weekly. Since her last surgery, she has remained in reasonably good health.

Summary and Conclusions

Fifty-six malignant lesions of the thyroid gland seen in the three Duluth hospitals from 1938 to 1953 have been reviewed. Carcinoma was found in 4 per cent of a series of 1,073 cases in which nodular goiter was treated surgically. Our incidence of papillary adenocarcinoma was somewhat less, and our incidence of undifferentiated adenocarcinoma somewhat more than the presently quoted figures of other authors. There has been a decided increase in the number of recorded

thyroid neoplasms the past four years and most of this increase is in the papillary and follicular adenocarcinoma group.

Malignancy was suspected in less than 20 per cent of the papillary lesions, in none of the follicular and alveolar group, but in 75 per cent of the undifferentiated neoplasms.

The treatment of papillary adenocarcinomas is usually total lobectomy and removal of the isthmus. If one or a few lymph nodes are involved, limited excision of the group or groups of nodes is indicated. It is believed that radical neck dissection and superior mediastinal node dissection have a definite but limited place in the treatment of this malignancy.

Follicular and alveolar adenocarcinomas are managed usually by total lobectomy and removal of the isthmus. The undifferentiated carcinomas are rarely operable and it is only the occasional case where a radical neck dissection is indicated.

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CURRENT CONSIDERATIONS OF TONSILLECTOMY WITH SPECIAL REFERENCE TO POSTOPERATIVE BLEEDING

Tonsillectomy is followed by complications more frequently than is generally realized, and it is the cause of more postoperative deaths than any other nose or throat operation. Poor technique and the custom of considering adenotonsillectomy as minor surgery account for large numbers of these complications and fatalities. Hemorrhage is the most frequent complication.

The authors doubt that remote tonsillectomy has anything to do with the development of poliomyelitis. Statistics are cited from the authors' practice to support their theory that antibiotics have no part in raising the incidence of post-tonsillectomy bleeding. Children under twenty months have only the adenoids removed and adenoidectomy precedes tonsillectomy in all patients. The usual solid food diet is promptly resumed.

Sulfathiazole gum is chewed for thirty minutes every four hours during the day. The authors routinely treat secondary bleeding with an intramuscular injection of double-strength U.S.P. posterior pituitary extract. They suggest the use of Aspergum if the throat is painful. While the salicylates lower the prothrombin time of the blood, this effect is not likely to occur if aspirin is taken in quantities after tonsillectomy.

In twenty-five consecutive cases given aspirin or Aspergum postoperatively, the prothrombin time was never below 80 per cent of normal. In most cases it was between 90 and 100 per cent of normal.

The authors feel that most cases of post-tonsillectomy bleeding are the result of infection and they never operate if there has been a recent infection, sore throat or cold, or if there is a temperature elevation.—McLaurin, J. W., and Raggio, T. P.: *J. Louisiana St. Med. Soc.*, 107: 91 (Mar.) 1955.

Tumors of the Parotid Salivary Gland

ROBERT W. UTENDORFER, M.D.
Minneapolis, Minnesota

PAROTID tumors are not common, their incidence being approximately 0.06 per cent of hospital admissions.[11] However, they form a sizable segment of patients with a tumor of the head or neck. The volume of literature concerning parotid tumors in recent years is testimony to the importance of these neoplasms, particularly to the individual so unfortunate as to harbor other than a strictly benign lesion.

When one considers parotid tumors, the usual concern is of mixed tumors since these are in the majority (85-90 per cent). Certainly, too, this is the most important group because adequate treatment may be entirely curative, whereas benign tumors will not recur if properly removed and the treatment of a frank carcinoma leaves much to be desired in long-term results.

The simple classification given in Table I is presented as a clinical guide in dealing with these lesions. Several features of this classification are worthy of comment.

Mixed tumors are classified as a separate entity, neither benign nor malignant. The exact nature of these lesions is as yet incompletely understood. It is probable that they are not entirely benign, neither are they malignant by usual criteria.[5] Instances of metastasis of a mixed tumor as such are undoubtedly infrequent if they do occur. However, they tend to recur locally if incompletely removed, and the recurrence may be definitely malignant and metastasize many years later. The classification of mixed tumor into two broad groups rather than more complicated histologic divisions has practical application in that the interstitial tumors are in the majority yet recur less frequently than the cellular tumors.[8] It is not possible to determine microscopically which will recur, recurrence being more a function of treatment than the type of tumor. The more cellular tumors would appear to have more potential in this respect, however. It is likely that mixed tumors are, as suggested by Willis,[14] a step in progression between definitely benign and definitely malignant lesions.

TABLE I. CLASSIFICATION

I.	Benign
	A. Adenolymphoma
	B. Adenoma*
II.	Malignant
	A. Adenocarcinoma { Papillary, Cylindroma
	B. Undifferentiated
	C. Squamous
	D. Sarcoma
III.	Mixed Tumor
	A. Parenchymatous
	B. Interstitial

*There is question as to the occurrence of adenomas. The occasional reported case is probably a cellular mixed tumor.

The benign lesion occurring with sufficient frequency to be clinically significant is the adenolymphoma. This is the only parotid tumor that has a sex predilection, being five or six times as common in the male. An adenolymphoma may be cystic and smooth but is clinically inseparable from mixed tumor—at least there is no reported case having been diagnosed preoperatively.[7]

The malignant nature of the cylindroma is recognized by classifying it as a type of adenocarcinoma, although it may not be as malignant as the usual parotid carcinoma.

Diagnosis

Parotid tumor should be suspected in the presence of any mass in the parotid area, therefore within a radius of 4.5 cm. from the angle of the jaw. Typically a mixed tumor projects sharply from the cheek (Fig. 1), is firm or hard and nodular, and displaces the ear lobe. Frequently it gives the false impression of being superficial because the superficial lobe of the gland tends to shift with the tumor. We have been impressed by the frequency of tumors occurring in the isthmus and deep lobe of the gland (nine of twenty in our cases) where they may be mistaken for lymph nodes especially when small (Fig. 2).

From the Department of Surgery of the Veterans Administration Hospital, Minneapolis, Minnesota.
Dr. Utendorfer is now located at 1453 Medical Arts Building, Minneapolis, having resigned as Assistant Chief Surgeon at the Veterans Administration Hospital.

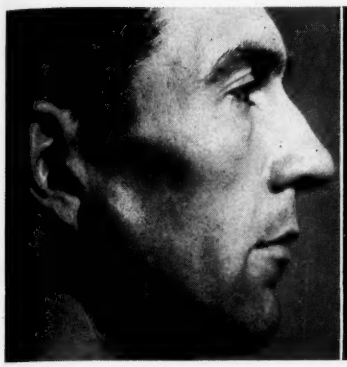

Fig. 1. Mixed tumor in superficial lobe of the parotid.

Fig. 2. Mixed tumor in the isthmus.

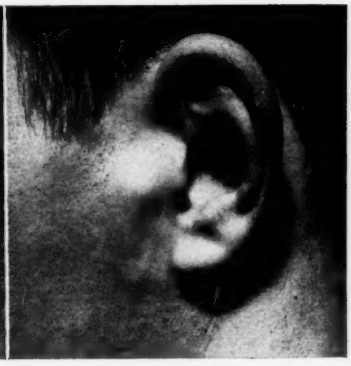

Fig. 3. Recurrent mixed tumor two years after incomplete removal through inadequate, poorly placed incision.

Differential Diagnosis

No attempt will be made to indicate a complete differential diagnosis of these lesions but a few important points may be mentioned:

Primary vs. Secondary.—Lymph nodes and lymphatic tissue exist in the parotid and consequently may receive metastases from a primary tumor elsewhere. This lymphatic tissue may be the site of involvement by Hodgkin's disease or other lymphoblastomas, and a Miculicz type of lesion has been described.

Inflammatory lesions with or without stone. We have encountered patients with unilateral swelling of the gland simulating tumor in whom no duct obstruction or tumor was demonstrated. This likely is due to a low-grade nonspecific parotitis. The presence of calculus may be demonstrated by x-ray, revealing an opaque stone, or by sialogram, and this is probably the most useful contribution of sialography. We have not been impressed by its advantage in demonstrating tumors or aiding in the differential diagnosis of the same.

An encapsulated cyst of the parotid may present as a solitary tumor, may not be associated with duct obstruction at the time and may become secondarily infected to further simulate a mixed tumor with necrosis. We have operated upon three such patients for "mixed tumor" and have done total parotidectomy only to find an encapsulated cyst without evidence of tumor in its wall. Biopsy at the time of operation may have prevented this, but separating inflammatory cyst from necrotic mixed tumor by frozen section presents obvious difficulties.

Lymph nodes, either hyperplastic or pathologic, may simulate tumor. This is particularly true of those behind the ramus of the mandible (v.s.), in which the reverse is more apt to happen, i.e., a parotid tumor is mistaken for lymph node.

Differentiation Between Benign and Malignant

It is usually possible to distinguish clinically between benign or mixed tumor and carcinoma. The chief differential points are listed in Table II, but of these several appear to be particularly significant.

TABLE II

	Benign (Mixed Tumor)	Malignant
Duration	Long	Short
Age	40—	40+
Size (variable)	Slow growth	Rapid or increasing
Contour	Project	May be flat-infiltrative
Consistency	Firm—hard	Hard
Mobility	Slightly	More Fixed
Pain	**Not usual**	**Frequent**
Paralysis	**Unusual**	**Frequent**
Metastases	**No**	**Frequent**

Presence of Pain.—Mixed tumors and benign tumors may occasionally be attended by mild discomfort but are usually asymptomatic. Pain suggests involvement of the trigeminal nerve by malignant growth.

Facial nerve paralysis occurring without previous trauma is an indication of malignancy. Mixed tumors frequently displace the nerve but do not infiltrate it and do not cause paralysis.

Characteristically mixed tumors tend to project sharply from the face and displace the lobe of the ear; carcinomas are more apt to be flat, infiltrative and less conspicuous, save for the obviously large advanced lesions.

The significance of metastases is obvious.

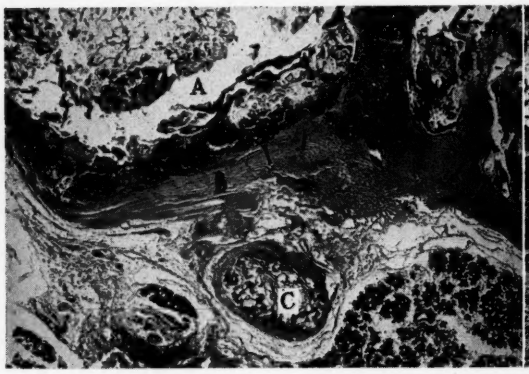

Fig. 4. X15. Typical daughter tumor (C) separated from main tumor (A) by capsule (B). Extracapsular removal of tumor may allow satellite nodule to remain.

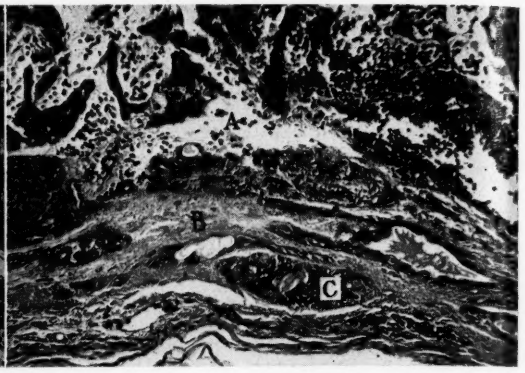

Fig. 5. X100. Penetration of capsule (B) by tumor cells (C).

Treatment

Radiation.—Parotid tumors in general are radio-resistant. Although a few favorable results have been reported in the treatment of mixed tumor, radiation is not recommended. Because of the highly malignant, anaplastic nature of many carcinomas, radiation probably should be used as an adjunct to surgery.

Preliminary biospsy is condemned because this violation of the capsule allows implantation of tumor cells. We have done biopsy at the time of surgery only on clinical suspicion of carcinoma, but it may be advisable to extend its application (v.s.).

Treatment of Mixed Tumor

Recurrence is the menace of mixed tumor. Figures as to recurrence vary, depending on the size of the series, type of treatment and length of follow-up, but a conservative estimate is about 25 per cent.[8]

A number of factors operate to produce this high figure.

1. Incomplete removal because of reluctance on the part of the surgeon to carry out wide excision in an area traversed by the facial nerve. Lack of understanding of the anatomy and unfamiliarity with the problem results in timid excision done too frequently with local anesthesia under the impression that these tumors are always benign (Fig. 3).

2. Error in diagnosis. We have seen a number of patients with recurrent tumors who were first operated upon with local anesthesia for "biopsy of a lymph node" or "removal of a cyst" resulting in incomplete removal of a parotid tumor after a tedious and distressing episode for both patient and physician. Although rupture of the capsule of the tumor may occur in any method of excision, it is probably most likely to occur in the above circumstance. Rupture of the capsule and morcellation of the tumor provides easy opportunity for seeding of tumor cells and invites recurrence.

3. The presence of satellite nodules, a characteristic of these multicentric lesions, is another cause of recurrence when the tumors are removed by the usual extracapsular dissection which may allow daughter tumors to remain. (Fig. 4).

4. Careful histologic examination of mixed tumors will show penetration of the capsule by tumor cells — another invitation to recurrence. Houck demonstrated this in 28 per cent of his series[6] (Fig. 5).

Because of this real threat of recurrence, the increasing risk of facial nerve injury with subsequent operations in a scarred area and the possibility of malignant change or primary low-grade malignancy,[10] the first operation must be thorough, to reduce recurrence, and at the same time should avoid injury to the facial nerve.

A number of approaches to this end have been advocated. Enucleation within the capsule, and enucleation within the capsule with subsequent removal of the latter have been used but are obviously unsatisfactory because rupture of the capsule may result in seeding tumor cells. Extracapsular dissection is more satisfactory but may lead to incomplete removal and recurrence as indicated above. Unfortunately, supplementing any

of the above methods by irradiation, either preoperative or postoperative, external or interstitial, or combinations of these cannot be expected to materially alter the recurrence rate.

tion, it should be productive of improved results if one may compare them with similar submaxillary tumors. The operation is done under general anesthesia, is tedious, and requires thorough

TABLE III.

	No. Cases	Total Parotidectomy	Superficial Lobectomy	Excision	Nerve Injury	
					Temporary Weakness	Weakness Potrion Mandibular Division
Primary Mixed Tumor	20	17	1	2	7	1
Recurrent Mixed Tumor	2	2				1
Adenolymphoma	1	1				
Cyst	3	3			1	

In contrast to the difficulties encountered in the treatment of mixed tumor of the parotid is the result obtained in these tumors when they occur in the submaxillary gland. Although not as frequent in the submaxillary, the same lesions occur, and here, too, the recurrence rate is approximately the same when simple excision of the tumor is performed. However, after total submaxillary excision recurrence is infrequent,[2,4] suggesting again that this is a function of the treatment rather than the type of tumor. Total submaxillary excision is a relatively simple procedure without many hazards except injury to the lingual nerve, which should not occur with an accurate dissection. Total parotidectomy, however, is attended by considerably more risk of facial nerve injury and has been considered almost impossible without damage to this structure; the usual concept being that the nerve passes through the substance of the gland. Probably the first accurate description of the surgical anatomy of the parotid was given by Bailey,[1] who confirmed the earlier findings of McWhorter.[9] They demonstrated that the facial nerve does not run through the gland in a strict sense but passes between the deep and superficial lobes, enclosed in the parotidomasseteric fascia.

Fortified with this knowledge it was apparent that total parotidectomy with preservation of the facial nerve was possible, and since Bailey's work a number of papers have appeared describing the technique. We have been interested in this approach for a number of years and during this time have been treating mixed tumors by total parotidectomy.[13] The results in terms of injury to the facial nerve are listed in Table III. While the follow-up is too short for statistical evaluaknowledge of the anatomy. However, the hazard to the patient once the technique is developed is less than the threat of recurrence.

Treatment of Carcinoma

Treatment of carcinoma of the parotid has been unsatisfactory by either surgery, x-ray, or combinations of both. These tumors are frequently undifferentiated and tend to metastasize to regional nodes and to distant areas. Unfortunately, they are usually resistant to x-ray, and although occasionally they may respond,[12] this is too often temporary and not curative. Their location in many instances influences the surgeon to perform a more conservative operation than is consistent with good surgical treatment of malignancy.

One of the important considerations in the management of these patients probably is adequate treatment of mixed tumors in general, their potentiality for undergoing malignant change being recognized.[10] In our own series there are two patients who had removal of what probably was a mixed tumor some twenty-seven and thirty years previously. In both of these there had been prompt recurrence, a long period of quiescence and more recently a rapid growth.

Faced with the problem of the patient with a carcinoma (and this must be confirmed histologically) without distant metastases, experience indicates that a combination of surgical excision and x-ray offers the greatest chance for cure.[3] It is further evidence that the "cured" patients have had radical surgical excision as part of their treatment.[10]

It appears that the loss of function of a portion or all of the facial nerve would be a small price

to pay for the possibility of cure by surgical excision. Furthermore, the primary tumor if not completely removed will, in all likelihood, involve the nerve and produce paralysis. We therefore have unhesitatingly removed the facial nerve with the tumor mass, carrying the dissection through the parotidomasseteric fascia, removing the masseter or a segment of the mandible when involved, and if cutaneous extension is present, have covered the defect with a skin graft. A cervical node dissection is done in continuity and postoperative irradiation given. In the postoperative period the cornea on the operated side is protected from ulceration by a shield or a tarsorrhaphy has been done. Long term results of this procedure have been discouraging (Table IV) but several features are apparent:

1. Patient F.K., who had a large fungating lesion, received palliation so that his remaining fifteen months were reasonably comfortable and no doubt his existence was prolonged.

2. In patient A.L. the rapid painful growth of his lesion was interrupted and he was without evidence of recurrence for three and one-half years.

3. No five-year cures are evident—two patients recently operated upon as yet show no evidence of recurrence, both of them being probably more favorable patients for cure. It is contemplated to do a fascial sling support to the eye in two years if there is no recurrence.

TABLE IV. CARCINOMA OF PAROTID TREATED BY RADICAL PAROTIDECTOMY, NODE DISSECTION AND X-RAY

Patient	Age	Duration	Previous Operation	Recent Growth	Pain	Paralysis	Type	Nodes	Recurrence	Result
A.L. 110972	53	2 mos.	0	+	+	0	Squamous	+	42 mos.	D 44 mos.
F.K. 111839	58	30 yrs.	30 yrs. 28 yrs.	+	0	+	Squamous	+	4 mos.	D 15 mos.
*A.A. 128344	64	7 mos.	0	+	+	0	Squamous	+	Persistence	D 4 mos.
B.H. 130807	42	10 yrs.	6 mos.	+	+	0	Adeno-carcinoma	+	5 mos.	D 9 mos.
M.R. 139919	46	27 yrs.	27 yrs.	+	+	+	Undiff.	+	4 mos.	D 13 mos.
J.H. 150539	59	20 yrs.	0	+	+	0	Undiff.	+	0	L & W 12 mos.
R.W. 152383	59	1 yr.	0	+	+	+	Adeno-carcinoma	0	0	L&W 7 mos.

*Incomplete removal—extension into carotid artery.

Conclusions

1. Our experience with some of the more common parotid salivary tumors is summarized.

2. Complete removal of a mixed tumor is best achieved by total parotidectomy.

3. Excision of a mixed tumor with local anesthesia is inadequate, and invites recurrence.

4. Preliminary biopsy allows seeding by tumor cells and is contraindicated.

5. Treatment of carcinoma is discouraging but a combination of radical surgical excision and irradiation appears to offer the best opportunity for cure.

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Intestinal Obstruction due to Inflammatory Strictures

EARL G. YONEHIRO, M.D.,
GRAFTON A. SMITH, M.D., and
JOHN F. PERRY, JR., M.D.
Minneapolis, Minnesota

INTESTINAL obstruction resulting from inflammatory strictures of the bowel has received little attention in the past five years. Although sporadic discussions have appeared in the past, this type of obstruction has become a less prominent problem today. Undoubtedly, the modern management of inflammatory diseases of the bowel, which includes the use of antibiotics and surgical extirpation of diseased segments of the gut, has controlled the primary disease prior to the obstructive stage in many patients. Despite these developments in therapy, obstruction occurring in the course of inflammatory disease of the bowel continues to be seen. Diseases, such as regional enteritis and ulcerative colitis, may progress to obstruction in spite of therapy. In fact, obstruction may actually be the complication that first brings attention to the disease. A consideration of this important though not common type of intestinal obstruction is presented herein.

Clinical Material

This report is based upon a review of forty-five cases of obstructions due to inflammatory strictures seen at the University of Minnesota Hospitals between January 1, 1942, and September 1, 1953. Two additional patients had inflammatory obstruction as an incidental finding terminally in their course, but since the cause of death was other than obstruction they are not included in this study. (One succumbed to acute fulminating ulcerative colitis; the second death was due to rheumatic heart disease, bacterial endocarditis and multiple myocardial abscesses). Only patients with acute abdominal distention with roentgenographic evidence suggesting mechanical bowel obstruction were included. In many cases a diagnosis of primary inflammatory disease of the bowel had been established at some previous admission to the hospital.

TABLE I. AGE DISTRIBUTION OF PATIENTS WITH INFLAMMATORY STRICTURE

Age (Years)	Cases	Per Cent
0-10	0	0.0
11-20	11	24.4
21-40	11	24.4
41-60	12	26.7
61-80	9	20.0
Over 80	2	4.5
Total	45	100.0

Age

There was a correlation between the ages of the patients and the causes of obstruction. In fifteen patients with regional enteritis the average age was twenty-six years. The average age of patients with obstruction from ulcerative colitis was forty-four years. Almost 87 (86.7) per cent of the patients who had obstruction due to diverticulitis were over the age of sixty years. Overall, only 24.5 per cent of the inflammatory obstructions were in patients over sixty years of age (Table I), while in comparison, 40.3 per cent of intestinal obstructions from all causes[8] were in this age group.

TABLE II. THE CAUSES OF INFLAMMATORY STRICTURES. 45 CASES*

Etiology	Cases	Per Cent
Regional enteritis	15	33.3
Diverticulitis	14	31.1
Colitis (ulcerative or regional)	5	11.1
Secondary to Radiation	5	11.1
Boeck's sarcoid	2	4.5
Traumatic	1	2.2
Strictures of unknown etiology	3	6.7
Total	45	100.0

*No deaths occurred among these cases.

Etiology

Regional enteritis and diverticulitis each accounted for almost one-third of the entire group (Table II). Ulcerative colitis, irradiation therapy, Boeck's sarcoid and trauma were less frequent causes.

The most common etiological disease, regional

From the Department of Surgery, University of Minnesota Medical School, Minneapolis 14, Minnesota.
Dr. Smith is a Damon Runyon Research Fellow and Dr. Perry is a National Cancer Trainee at the University of Minnesota.

enteritis leads to narrowing of the lumen by a process of ulceration and polypoid changes in the mucosa, followed by fibrosis with stiffening of the bowel wall finally resulting in partial or complete obstruction. On radiologic examination this condition frequently produces the characteristic "string phenomenon." In our series slightly over one-half of the patients (53 per cent) had the "string sign" demonstrated by roentgenograms. Although this disease may involve portions of the proximal colon all cases of obstruction seen in this series were of the small bowel. In our experience of 746 cases of small bowel obstruction seen at the University of Minnesota Hospitals from January, 1942, to September, 1953, fifteen cases (1.6 per cent) were due to regional enteritis. Similarly, Bollinger and Fowler[1] found that 2 per cent of small bowel obstructions were due to regional enteritis. Although, its incidence among the entire group of intestinal obstructions is not high, the potentiality of this disease to lead to obstruction is ever present.

The second important cause of inflammatory strictures, diverticulitis, causes obstruction through edema and spasm resulting from an inflammatory reaction within the characteristic mucosal sacculations. Thirteen cases of obstruction due to diverticulitis (one diverticulum occurred in the jejunum) occurred among 506 cases of large bowel obstructions seen during the 1942-1953 period, or an incidence of 2.7 per cent. This correlates fairly well with the findings of Michel et al[5] who reported that 3.8 per cent of acute obstructions of the colon in their series were due to diverticulitis.

A less frequent cause of obstruction was ulcerative colitis, a disease which may involve any part of the colon or the terminal ileum. Shallow ulcerations and denudation of the mucosa in the acute phase progress to diffuse scarring of the bowel wall and narrowing of the lumen, giving the typical "lead pipe" appearance on roentgen examination. Obstruction can occur at any stage of this disease. Colic strictures due to ulcerative colitis accounted for 11.1 per cent of the patients in this series.

A less common cause of obstruction was stricture secondary to abdominal or pelvic irradiation. Recently, Gardner and Arlyon,[3] as well as others[4,9] have called attention to this particular sequelae of irradiation therapy. The acute hyperemia and mucosal edema of irradiation may lead to cicatricial constrictions and subsequent obstruction. The five cases in this study followed roentgen therapy used in the treatment of pelvic malignancies.

Sarcoidosis of the small intestine accounted for two instances of stricture. These cases illustrating isolated sarcoidosis simulating non-specific ileojejunitis have been previously reported.[13]

There was one case of stricture secondary to trauma which had resulted from a self-administered enema. Although not common, blunt trauma to the abdomen with hematoma of the bowel wall has led to stricture formation and obstruction. Also stenosis resulting from limited intestinal infarction by mesenteric vascular occlusion, incarceration within a hernia, and intussusception have been reported.[11]

Tuberculosis has been cited as one of the most common causes of inflammatory strictures of the bowel.[11] However, obstruction of tuberculous origin has not been seen on the surgical service of this hospital for over a decade. This is doubtless due to the fact that patients with chronic tuberculosis are not regularly admitted here. Unfortunately, specific information of the incidence of enteric tuberculosis from sanitoria sources is wanting, but with improved and newer antibiotic therapy it appears reasonable that the incidence would be decreasing.

Diagnosis

Recognition of the presence of obstruction due to inflammatory disease of the intestine is dependent upon clinical awareness of this possible event in the course of diseases such as regional enteritis, diverticulitis and ulcerative colitis.

Of primary importance is the recognition of the presence of obstruction *per se*, and evaluation as to degree, location and possible presence of strangulation rather than the exact etiologic diagnosis. However, identification of the type of underlying mechanism is important, and although the exact diagnosis of the nature of an obstruction is often inferential, careful inquiry with pertinent roentgenograms will lead to a correct diagnosis of the cause of obstruction in most cases.

In this series of cases, most of the patients had been treated medically prior to their obstruction and the diagnosis previously established.

In the presence of partial or complete intestinal obstruction due to inflammatory stricture, careful roentgenographic studies often revealed pertinent

information. Aside from the usual flat and upright roentgenograms of the abdomen more detailed information regarding the possible cause of obstruction was obtained in a few instances through the use of special roentgenographic studies. Although most roentgenologists agree that the examination of the terminal ileum may be accomplished by barium enema alone, there are cases in which the competency of the ileocecal valve cannot be overcome. Barium taken by mouth may render a partial obstruction complete. Therefore in such instances, a long intestinal tube (Smith, Miller Abbott, et cetera) passed into the small bowel followed by an injection of a small amount of thin barium just proximal to the site of obstruction[2,6] is the preferred method for visualization of the stricture. This method not only serves as a diagnostic tool, but it also affords an avenue for aspiration of the barium mixture following the examination. In addition, the use of a thin mixture of barium definitely lessens the risk of complete obstruction. During barium enema examination, the column of barium should not pass the site of occlusion in any obstructed patient with colonic distention. In fact, if the distention is severe, laparotomy without delay is indicated.

Treatment

Of the forty-five cases seen, thirty-one patients received operative management, while fourteen patients were successfully treated with suction decompression and intensive antibiotic therapy. Of the thirty-one patients operated upon the stricture was excised primarily in twenty-eight instances. In three cases the bowel was not resected (Table III). Of this latter group, two patients received a decompressing transverse colostomy performed in the face of severe colonic distention. The other patient had a jejunal diverticulum causing obstruction. This was excised with simple closure of the resultant defect.

Although conservative management was successful in a fairly large number of patients (fourteen of forty-five cases), prolonged delay of surgery in the face of unrelenting obstruction is never warranted. Recently, Bollinger and Fowler[1] have stressed the hazard of procrastination associated with suction decompression in the treatment of intestinal obstruction. They have shown an increase in mortality rates with delay in surgery. At the University of Minnesota Hospitals uncomplicated simple small bowel obstructions are currently treated with an approximate twelve-hour trial of intestinal suction,[8] at the end of which time operation is undertaken if there has been no progressive relief of the distention. Distention encountered at surgery is preferably handled by decompressive enterotomy[10,12] or long intestinal tube insertion.[7,12] The problems of postoperative management are considerably lessened by the use of such techniques.

TABLE III. OPERATIVE TREATMENT OF INFLAMMATORY STRICTURES. THIRTY-ONE CASES

Nature of Surgery	Site of Obstruction: Small Bowel	Large Bowel
1. Bowel resection	20	8
2. Not resected	1*	2†
Total	21	10
3. Surgical decompressions used in above surgery		
a. Colostomy	0	5†
b. Ileostomy	1‡	2
c. Witzel enterostomy	1‡	0
d. Long tube insertion at surgery	2‡	0

*Excision of jejunal diverticulum.
†Colostomy concommitant with resection in three patients and decompression by colostomy alone in two patients.
‡Methods of decompression proximal to the site of resection.

Because of the etiology of this type of obstruction, patients with inflammatory strictures should be placed on intensive antibiotic therapy. The fact that almost one-third of these obstructions relented following conservative suction management and antibiotics attests to the value of these measures in certain cases.

In operative cases, a primary resection was done in all cases except where colic distention was of such magnitude as to make this unwise. All surgical candidates should be relieved of intestinal distention prior to bowel resection preoperatively or at the time of surgery. If an operative method of decompression is not employed (enterotomy, colostomy, et cetera), a long intestinal tube should be utilized during the postoperative period for control of distention in the area of the anastomosis.

Mortality Rate

There were no deaths among the forty-five cases reviewed in this series.

The patients in this study fell predominately in the early middle-age group which is in contrast to the older age of patients with obstruction from all causes.[8] The relative young age of patients in this series may be responsible, at least in part, for the fact that there were no deaths; but im-

(Continued on Page 500)

Motor Vehicle Safety for Minnesota Children

EARL M. LARIMER
Saint Paul, Minnesota

MOTOR vehicle accidents on Minnesota's streets and highways during the past five years took the lives of 645 children in the four age brackets from 0 to 19 years. These fatalities to the youth of our state represented 21.8 per cent of the 2,962 deaths resulting from motor vehicle accidents during that period. Deaths in this age group reached a high of 148 in 1952 and accounted for 27.4 per cent of that year's total road toll. Figures and percentages for the five-year period are shown in Table I.

TABLE I.

Year	Total Traffic Deaths	Children Age 0 to 19	Percentage of Total
1950	532	91	17.3
1951	612	120	19.6
1952	539	148	27.4
1953	638	145	22.7
1954	641	141	22.0
Totals	2,962	645	21.8

TABLE II. DEATHS BY AGE GROUPS

Year	0 to 4	5 to 9	10 to 14	15 to 19	Total
1950	17	13	15	46	91
1951	25	28	16	51	120
1952	27	34	27	60	148
1953	33	22	22	68	145
1954	23	22	24	72	141
Totals	125	119	104	297	645

As might be expected, the greatest number of deaths from motor vehicle accidents involving children occur in the 15 to 19 age group because of the greater exposure brought on not only by non-driver activities but because most youngsters in this group begin to drive automobiles. Table II shows the number of deaths by age groups for the past five years. It is interesting to notice that the 10 to 14 age group has the lowest number of deaths for the five-year period.

A total of 176 juvenile pedestrians were killed in Minnesota traffic accidents during the past five years (Table III). It is interesting to see the drastic drop in fatalities in the two higher age groups, indicating a growing awareness of traffic dangers, on the part of youngsters in these groups, and also include youngsters who are old enough to think for themselves and are able to avoid involvement in accidents, even though they may not have parental or adult protection during most instances of their exposure to accidents. *It is tragic that 74 per cent of the deaths involving juveniles fall into the age groups from 0 to 9 years—ages at which close parental supervision should prevent most of these fatalities.*

TABLE III. PEDESTRIAN DEATHS

Year	0 to 4	5 to 9	10 to 14	15 to 19	Total
1950	9	6	6	8	29
1951	11	18	4	—	33
1952	9	20	5	6	40
1953	18	15	4	5	42
1954	13	11	5	3	32
Totals	60	70	24	22	176

TABLE IV. BICYCLE FATALITIES

Year	0 to 4	5 to 9	10 to 14	15 to 19	Total
1950	—	4	5	—	9
1951	—	3	2	—	5
1952	—	3	4	—	7
1953	—	2	3	1	6
1954	—	1	3	1	5
Totals	—	13	17	2	32

All but two of the thirty-two fatalities befalling juvenile bicyclists during the five-year period were in the two age groups of 5 to 9 years and 10 to 14 years (Table IV). This is due, no doubt, to the fact that those in the former group are just learning how to ride bicycles, while those in the latter group are at a more daring and careless age but not probably fully aware of their responsibilities and duties as cyclists. It is entirely understandable that there were no fatalities

Mr. Larimer is Director of Highway Safety, Minnesota Highway Department.

in the 0 to 4 year age group because these youngsters had not yet reached the bicycle-riding stage. (Tricycles and other such vehicles are not classified as bicycles by the National Safety Council, with any deaths involving such vehicles considered as "pedestrian" accidents.) The reduction of bicycle deaths in the 15 to 19 year group is probably due to a decreased utilization of bicycles

TABLE V. MOTORIST FATALITIES

Year	0 to 4	5 to 9	10 to 14	15 to 19	Total
1950	8	3	4	38	53
1951	14	7	10	51	82
1952	18	11	18	54	101
1953	14	5	14	63	96
1954	10	10	16	68	104
Totals	64	36	62	274	436

TABLE VI. SEX AND AGE OF DRIVERS, 1952

	All Accidents		Fatal		Personal Injuries		Property Damage	
	Male	Female	Male	Female	Male	Female	Male	Female
Rural								
14 and under	39	4	3	1	14	3	22	—
15 to 19	1,264	178	46	3	833	67	1,185	98
Totals	1,303	182	49	4	847	70	1,207	98
Total All Age Groups	17,375	1,669	387	40	6,141	631	10,847	998
Urban								
14 and under	72	6	2	—	22	3	48	3
15 to 19	6,316	496	26	2	1,250	102	5,040	392
Totals	6,388	502	28	2	1,272	105	5,088	395
Total All Age Groups	61,164	7,358	197	16	11,416	1,541	49,551	5,801
Totals All Age Groups Rural + Urban	78,539	9,027	584	56	17,557	2,172	60,398	6,799

TABLE VII. BICYCLE VIOLATIONS, 1953

Violations	All Acc.	Fatal Acc.	Bicyclist's Age						
			8 or Under	9 to 10	11 to 12	13 to 14	15 to 19	20 & Over	Not Stated
Inadequate brake	8		2	2		2			2
Improper lights or no lights	13	4	1	1	2	4	1	3	1
Failed to grant right of way to vehicle	55	1	17	18	5	12	2	1	
Improper turning	41	1	12	10	11	6	2		
Wrong side of road	20	1	6	5	4	2	1	1	1
Carrying passengers	10	2	2	3		4	1		
Disregarded traffic control	23	1	3	8	2	6	1	1	2
Failed to ride single file	1			1					
Failed to stop leaving driveway or alley	46		20	13	4	6	1		2
Failed to signal or improper signal	12		5	2	4	1			
Riding on sidewalk crossing alley or driveway	11		5	3	1	2			
Other violations	2			1	1				
Total number of violations	242	10	73	67	34	45	9	6	8
Number of bicycle accidents	320	8							
Percentage of bicyclists in violation	75	75							

in favor of automobiles.

By far the greatest number of juvenile fatalities resulted from accidents which are here termed "motorist fatalities," for want of a better name (Table V). They include deaths from such motor vehicle accidents as running off the roadway, collisions, railroad grade crossing accidents and any other accidents where one or more motor vehicles are involved, but excluding pedestrians and bicycles. A total of 436 youngsters in the four age groups were killed during the past five years, an average of more than 84 per year. Deaths in the three lower age groups were not alarmingly high, but those in the 15 to 19 age group alone accounted for more than 60 per cent of all the juvenile fatalities. This greater incidence, of course, is due to the fact that members of this group—the so-called "terrible teenagers"—do a great deal of driving, thereby exposing themselves to more accidents and resultant deaths. This study will not attempt to compare traffic death rates for this age group with older groups.

A number of studies have been made along this line and some comparatively reliable figures are available.

In a study of 87,566 reported traffic accidents in 1952, it was shown that 8,375 or 9½ per cent involved drivers under twenty years of age (Table VI). Their involvement in fatal accidents, however, was slightly higher, with the study showing that they were driving vehicles in eighty-three of the 640 fatal accidents, for a percentage of 11½.

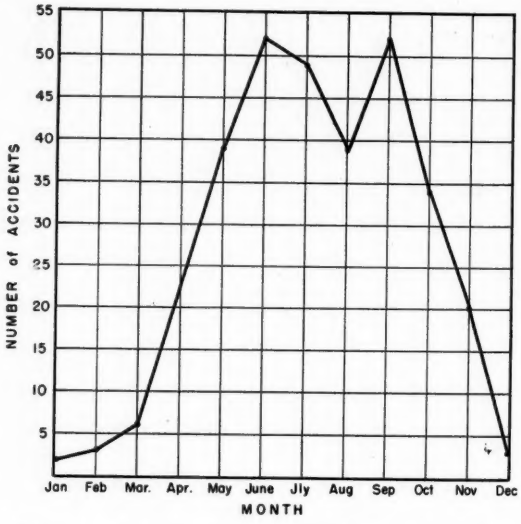

Fig. 1. Bicycle accidents by month of occurrence, Minnesota 1950-1954.

The Minnesota Department of Highways conducted a special study of bicycle accidents reported in 1953 and upon the basis of that analysis the cause for 75 per cent of the accidents was violation of traffic rules by bicyclists themselves (Table VII). The study considered a total of 320 bicycle accidents, involving all age groups, in which there were 242 violations, and of these violations, all but fourteen were charged to bicyclists under twenty years of age. The three chief violations were failure to grant right of way to a vehicle, failure to stop when leaving a driveway or alley, and improper turning.

This study of bicycle accidents also revealed that only fourteen of the 320 accidents occurred during the months of inclement, cold weather—January, February, March and December (Fig. 1). It also revealed that the first month of summer vacation, June, and the first month of school, September, were tied with fifty-two accidents each to rank as the two highest in the number of bicycle accidents.

An analysis of pedestrians' actions which resulted in fatalities during 1953 reveals that a total of fourty-two youngsters in the four age groups were killed (Table VIII). The two leading causes were crossing streets or roads at points other than intersections and running or walking from behind parked cars into the paths of vehicles.

In the above tabulations and discussion, the deaths which befell youngsters as the result of traffic accidents have been presented in some detail. The natural question that now arises is: *"What can we do to prevent a continuance of these tragic deaths to our youth?"*

Despite my background as an enforcement officer as a member and later as chief of the Highway Patrol, I believe our main hope for improvement in this particular field lies not so much in enforcement as in education. And by education I do not necessarily intend to confine this to a formalized, classroom taught method of instruction. I see it as a daily, year-round program of safety instruction, not only by teachers, but by parents, older brothers and sisters and other adults who have control or direction over youngsters.

Imitation, it has been said, is the sincerest form of flattery. The imitation by children of the actions and behavior of adults is a primary application of a basic educational principle. This is especially true among the very young children who are making their initial venturesome trips into the dangers of traffic. They remember more vividly their parents' actions than the last-minute parental admonitions, so are more likely to imitate bad and dangerous walking practices than to observe the safe-walking reminders with which they were ushered from their homes.

It would appear then, that the only way to tackle the problem of safety education for our children is to begin with a safety education program for their parents and other adults in order that their walking and driving practices will conform with accepted standards. Such acceptance of their responsibility, not only to themselves but also to their children, would be a tremendous advance in the field of traffic safety. Not only would it induce their children to "get off on the right foot" as they encounter the difficulties of

present day traffic, but it would make them more receptive to further safety instruction as they grow older, begin to ride bicycles and later to drive automobiles.

The 125 youngsters in the age group 0 to 4 years who were killed during the five-year period from 1950 through 1954—an average of twenty-five per year—were, beyond any doubt, killed because of their parents' failure to exercise normal, prudent concern for their safety. The youngsters who toddled out into the street and were struck by passing cars, those others who were crushed beneath wheels of vehicles while they played in streets, other youngsters who were killed when their parents' cars ran off the road or struck fixed objects—all of these deaths are chargeable directly to the parents who failed to keep their cars under control or who failed to exercise proper supervision over their children's activities. One can put forth an academic argument that a child which runs into the street is at fault in the event of a fatal accident—but a child of less than four years of age cannot possibly know the dangers of vehicular traffic. That is a danger which such a young child cannot comprehend. It is only necessary to ask a grieving mother or father to assess the blame for their child's death—they will shoulder the blame themselves because they realize then, when it is too late, that it was up to them to so circumscribe their child's activities to rule out any chance of an accident.

In the next two age groups—from five through fourteen years of age—the parents begin to delegate some of their responsibility for the safety of their children to school teachers. It is essential that every elementary school, regardless of its size or location, include thorough instructions in every phase of safety with which a child in these age groups may be confronted. These should cover virtually every subject of traffic safety, with the possible exception of the operation of a motor vehicle. Safe and proper walking habits should be inculcated in every student. He should be told and shown what is right and what is wrong insofar as his behavior as a pedestrian is concerned. Whenever practicable, school safety patrols should be operated, not only because they have proved themselves to be the best means devised to date for the safe conduct of children to and from school, but because they are a very powerful force in shaping the walking habits of children at other times in the absence of safety patrol officers.

TABLE VIII. PEDESTRIAN FATALITIES, 1953

Pedestrian Actions	Pedestrians Killed				
		Age			
	Total	0 to 4	5 to 9	10 to 14	15 to 19
Crossing at intersection with signal	1				1
Same—no signal	3		1	1	1
Same—diagonally	1	1			
Crossing not at intersection	10	6	3		1
Coming from behind parked cars	11	4	6	1	
Walking in roadway—sidewalks not available	3		1	1	1
Playing in roadway	9	6	3		
Not in roadway	2			1	1
Not stated and other	2	1	1		
Total killed in these age groups	42	18	15	4	5

With a large number of children being transported to and from schools, another important facet of their safety education must deal with the special hazards which mass transportation involves. Here again it has been found that a well-trained bus safety patrol is the best means for assuring orderly embarking, riding and disembarking, and it too instills in the young child an awareness of the dangers which must be faced prior to embarking and after disembarking, not only when buses are concerned but at all times.

Most of the bicycle accidents fall into the two middle age groups, with many of them occurring as students are going to or from school. A complete and thorough course in the study of all traffic laws which apply to the use of bicycles, formation of bicycle safety clubs, and use of reflective materials are all weapons which can and must be used to reduce accidents and deaths to bicycle riders in these age groups.

Room for the greatest gains in traffic accident prevention among our four juvenile groups lies in the 15 to 19 year group, not only because 297 or 46 per cent of the deaths are concentrated in this bracket, but because these teen-agers are the most difficult to reach through safety education programs.

Many of these youngsters, especially in rural areas, are no longer in school and even though they may not have automobiles of their own, they do have ready access to a family car or truck. All too often, they do not have the benefit of formal classroom training in the operation of a car, but acquire varying degrees of knowledge from parents, older brothers or sisters. They have but a fleeting acquaintance with traffic laws

and regulations and are quite often totally ignorant of traffic courtesy. Their idea of a "good" driver may be one who gets away first from a traffic light, gets to the next traffic light first, weaves in and out of traffic, makes pedestrians in cross-walks jump for their lives and commits all the other acts, bordering on rowdyism, which they have come to associate with their "ideal" driver. It is extremely difficult to convince such a young driver that this type of driving is wrong, that it breeds disrespect for all kinds of law and order, and that it invites traffic accidents for which he will be blamed by more conservative drivers. In fact, it is entirely possible that he will not take kindly to any of your suggestions that he tone down his driving, but you are most likely to have a challenge hurled at you to prove if he or you are the better driver. How do you get out of such a situation? Simply by accepting the challenge, driving sensibly and entirely within rules and regulations, and thus proving to your young friend that good driving does mean safe common-sense driving. Just as a young child learns good or bad walking practices by imitating his parents, so does a young and impressionable teen-ager acquire safe or dangerous driving habits from his parents.

In my opinion—and this is backed up by men and women who have been in this particular phase of safety work much longer than I—the one great hope for instilling proper attitudes and imparting good driving habits to our young people lies in the driver education program such as is presently being conducted in the high schools of our state. This is forcibly brought out in a yet-incomplete study of 3,000 drivers, one-third of them being untrained drivers, another third having had classroom instruction only, and the remaining one-third having had the benefits of both behind-the-wheel and classroom instruction. Their three-year records revealed that 231 of the first category were involved in traffic accidents, 180 in the group having had classroom instruction and only 119 in the fully-trained group.

I don't believe it is necessary to elaborate further on the results to date of the program. In my own mind I am convinced that a continued expansion of the driver training program, until it eventually is offered by every public and private secondary school in the state, is our one "great hope" in reducing our rate of traffic accidents and deaths. The youth of today, who will be the drivers of tomorrow, must be given the opportunity to learn the right way to drive if they are to be safe drivers. They must be taught what factors are combined to produce a good, safe, intelligent and courteous motorist. When we have done that we will have made motoring not only safe for youngsters, but will have laid the firm groundwork for safer driving for everyone, regardless of age.

HYSTERECTOMIES

(Continued from Page 457)

JOHNS A. HAUGEN, M.D.—I would like to congratulate Dr. McKenzie for his efforts in making such a study. Unfortunately records are so deficient that it is hard to properly classify much of the material. I believe it should be emphasized that the uterus often has to be removed without having inherent pathology. Much of our gynecological surgery entails a hysterectomy, both abdominal and vaginal, for uterine prolapse. Also, in severe degrees of cystocele, rectocele and enterocele, the most satisfactory procedure often includes removal of the uterus. The pathologist, and more recently our new tissue committees, should bear this in mind.

B. A. SMITH, M.D.—The urinary tract complications are very few in this report. In other investigations, ureteral injury is reported in 2 to 2.5 per cent of major pelvic operations and up to 30 per cent in radical hysterectomies. These figures are in part obtained in studies of ureteral injury, in which excretory urograms were made postoperatively as a routine, since the complete ligation of one ureter is silent unless infection is present above.

Lesions involving the broad ligament such as endometriosis or intraligamentous cysts and myomas are particularly prone to ureteral injury.

Discussions of this problem are more and more frequent in urologic literature and the urologist feels that preoperative excretory urography is indicated in all cases where difficulty is expected, even remotely. Inlying ureteral catheters should be placed if any trouble at all is anticipated; the ureters are then usually delineated with ease.

Seminar

THE DRUG THERAPY OF HYPERTENSION

A Review of Recent Literature

THADDEUS M. CHAO, M.D.
Minneapolis, Minnesota

HYPERTENSION of the essential type, as opposed to hypertension due to a specific cause like pheochromocytoma, is a disease which is a composite result of several factors acting upon the organism. Some of these factors are known as a result of direct observation in the laboratory and others are presumed to be present as a result of observations of empirical therapy. Still others are assumed to be present largely on the basis of inductive reasoning. The etiological mechanisms of pathologic physiology in this disease at present defy the utmost in investigative skill so that a definitive and rational application of therapy is almost always an impossibility. It is the purpose of this paper to discuss the merits and limitations of some of the drugs available to the internist and general practitioner for the treatment of this disease. Thus, one may be able to offer to many patients the hope of a relative state of comfort and continued productive existence.

Investigators have generally found it useful to start with an analysis of the disease, breaking it down to fit into two categories. The first is a system of evaluation of the hypertension per se. This is exemplified in the following table from Schroeder[12] (Table I). Table II is the classification of funduscopic changes as listed by Schroeder.[12] Special attention is directed towards the fact that the prognosis of the disease is fairly benign until one reaches diastolic pressure levels of 120 to 160 at which time the patient is at least in a stage of severe benign hypertension if not in the malignant phase of the disease. From this time on, the course of the disease is measured in years to weeks. Apparently, the three principal dangers that will affect the patient will consist of effects on the heart from overwork, deterioration of the kidney with the onset of arteriolar nephrosclerosis, and the acceleration of the onset and progression of generalized atherosclerosis.[1,3,12,13] With this in mind, the therapist must consider not only the fact that he can lower the blood pressure, but also must consider the effects of inducing a state of relative hypotension in an organism physiologically adjusted for years to hypertension. The lowering of blood pressure in a diseased kidney may produce disastrous effects by impairing glomerular filtration rate and affecting tubular function so that a uremic state is further aggravated.[7,9,13] Thrombosis might be induced in diseased arteries.[3,7,9,11] The drug used also may possess side reactions which if not recognized or offset, may cause harmful effects.[1,9] This last possibility applies to all the drugs which will be discussed in the following paragraphs, for although some are better than others in specific cases, none of them approach the ideal, which would be a drug which reduced blood pressure without possible side effects severe enough to threaten the life of the patient.

The second approach to the evaluation of the disease in the patient is the determination of the factors which are most likely to be causing the disease. As previously noted, these factors are rather nebulous, but they are useful in that they can lead to a more intelligent approach to the problem of therapy. In other words, although many drugs cause a lowering of hypertension, they are not interchangeable, for their modes of action vary, and it should be emphasized that the effectiveness of any drug cannot be accurately predicted. It is evident, therefore, that there is no substitute for a trial period of treatment.[1] In many cases of mild hypertension, good results may be obtained by the judicious application of basic psychotherapy, and if drug treatment is considered, an appropriate dosage of a mild sedative may be all that is necessary.[12,16] In the more severe cases of hypertension, such palliative methods are generally ineffective, and the drugs that will now be discussed are generally felt to be

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Presented at a Grand Rounds on the Medical Service at Ancker Hospital, St. Paul, Minnesota.

Dr. Chao is a Resident in Internal Medicine, Minneapolis Veterans Administration Hospital, Minneapolis, Minnesota.

TABLE I. STAGES OF HYPERTENSIVE DISEASE

Stage	Approximate Diastolic Pressure, mm.Hg.	Ocular Fundi Grade	Rate of Progress	Remarks
0 Prehypertension	85-95	0	Variable	Asymptomatic. No damage unless it progresses to other stages.
I Mild benign	90-105	0-I	Variable	Consistent with long life. May reverse to normal.
II Moderate benign	105-120	I-II	Slow	Consistent with long life unless complicated. Occasionally reverses to normal.
III Severe benign	120-160	II	Usually rapid (years)	Apoplexy and heart failure may develop. Long life rare.
IV Malignant				
(a) Early	130-160	III	Usually rapid but reversible	Danger signal for downhill course.
(b) Severe	130-200	IV	Rapid (months)	Usually fatal unless interrupted.
(c) Decompensated	130-200	IV	Rapid (weeks)	Renal insufficiency and heart failure. Always fatal.

NOTE: The course of the disease can be modified at any stage by the development of atherosclerosis or other vascular disease. The estimations in the above table were made on the assumption that this would not appear in the normal course of events.

Early malignant hypertension as used here is a clinical condition and often represents the transition between the benign and malignant stages. High, fixed diastolic pressures, diminution of renal function and retinitis, usually either severe or with blurring of the nasal margins of the optic discs are present. This is not to be confused with the pathological condition found in renal insufficiency, "malignant sclerosis" with necrosis of arterioles.

—Schroeder, VA TB 10—102, 1954.

TABLE II. CLASSIFICATION OF CHANGES IN OCULAR FUNDI

Grade	Arteries	Veins	Retina	Disc	Interpretation
I	Constricted. May be segmented.	Normal	Normal	Normal	Benign hypertension, young individual, or short duration.
II	Sclerotic. Tortuous, increased light reflex.	Normal or full. Nicking at A-V crossing.	Normal	Normal	Benign hypertension of long duration, or with arteriosclerosis.
III	Same as I or II. May show blurring.	Full.	Hemorrhages and/or exudates of all varieties and sizes.*	Normal or nasal margin blurred.	Early malignant stage beginning. Severe stages present. Danger signal.
IV	Blurred, perivascular edema. Constriction intense.	Full.	Same as III* May be pale. Edema.	Swollen 1-5 diopters.	Malignant stage full blown. Rapid breakdown imminent. Increased intracranial pressure.

NOTE: Vision is usually normal in grades I and II unless severe arteriosclerosis has developed. In grades III and IV, scotomata are present, depending on location of lesions. Vision may vary from no noticeable change to complete blindness. Detachment of choroid or retina can occur.

*Must be differentiated from thrombosis of central vein or artery, usually unilateral.

—Schroeder, VA TB 10-102, 1954.

specific antihypertensive agents and, as such, apparently act by affecting neurogenic, nephrogenic and possibly humoral mechanisms.

Potassium Thiocyanate

This drug has the distinction of being about the oldest available drug used in this country for the control of hypertension, having been used for some fifty years.[4] However, with the advent of the newer drugs and because of the dangers inherent in its use, especially over a prolonged period of time, it has perhaps fallen into disfavor. This is unfortunate, for the drug has real value in the treatment of headaches secondary to hypertension, and apresoline therapy, and has value as a supplementary aid to other anti-hypertensive drugs which are ineffective in alleviating the associated headache. A dramatic and marked effect may be noted in the intravenous administration of this drug.[1]

Besides its effect as a smooth muscle relaxant, the thiocyanate ion also is likely to produce symptoms characteristic of iodism. The prediction of which patient will develop toxic reactions to the drug is not possible, although it is generally agreed that the serum thiocyanate level in the blood should never exceed 15 mgm. per cent. Even at this level, mild toxic reactions may be noted, and above this level, the danger of severe toxicity is very real. A blood level of 4 to 8 mgm. per cent will usually be as effective therapeutically as higher concentrations. It is essential that periodic checks be made on the blood thiocyanate level, for this tends to fluctuate markedly, even in the same individual.[1,3] The usual initial dose is 0.3 gram of the sodium or potassium salt daily for three days. In a report of a case from the Mayo Clinic, a patient's headache was obviated within two hours after receiving 60 cc. of a 5 per cent solution of sodium thiocyanate I.V. Maintenance dosage for this patient was 0.4 to 0.6 grams of potassium thiocyanate daily, and at time of discharge in three weeks, his blood-cyanate level was 8.3 mgm. per cent. A final note of caution is that intolerance to the drug cannot be determined in advance,[1,4] and yet it is felt that in conjunction with the other drugs that make up the armamentarium of the hypertension therapist, this drug has definite value for the conditions noted above.

The Veratrum Compounds

Since it is not clear whether the phenomenon of essential hypertension is due to hyperactivity of the sympathetic system or to hypoactivity of the parasympathetic system, one of the approaches to therapy is the use of drugs which presumably act principally as stimulators of the parasympathetics. These drugs act at the hypothalamic level and appear to induce their hypotensive effects by inducing a decline in cardiac output, bradycardia and an evenly distributed reduction in peripheral resistance.[6] One of the major drawbacks to the use of these drugs is that the therapeutic and toxic levels are so close together that the patients often experience nausea and vomiting. Because of bradycardia-inducing properties, and possible positive inotropic action of the drugs, they have often been used in hypertensive patients with tachycardia. However, because of their vagomimetic action, they should be avoided during the time of rapid digitalization for fear of causing heart block. This latter complication can be relieved by the intravenous administration of 1 mgm. of atropine sulfate.[7] In general, these drugs are most beneficial in the treatment of moderate and mild hypertension. In cases involving reduced renal function with azotemia, the drugs may be more effective than hexamethonium which may be poorly excreted. No special contraindications to their usage are noted except those which apply in general to any hypotensive agent; for example, their use in atherosclerotic patients wherein the dangers of thrombotic complications are a definite risk.

Available preparations vary in their composition of alkaloids derived from Veratrum viride. Vertavis contains whole powdered Veratrum viride and potency is measured in carotid sinus reflex units (CSR). It is available as an oral tablet of 130 CSR units, and the recommended total daily dosage is 3 to 9 tablets. Other preparations are Veriloid, Vergitryl, Unitensin, Veralba and provell maleate. These last two contain protoveratrine A and B, a single ester alkaloid of Veratrum alba. The usual dose of protoveratrine is 800 to 2000 micrograms or about a tenth of the dosage of veriloid. One recommended dosage schedule[1] is to give 200 to 250 micrograms before meals and at bedtime and to increase the dose daily by 100 to 200 micrograms until the blood pressure is satisfactorily reduced or until side effects occur. If at a level of 500 to 750 micrograms four times a day the blood pressure is still high, it is doubtful whether larger doses will be effective. The dosage schedule recommended by Hoobler[8] for orally administered protoveratrine is presented. The initial large dose (.50 to 1.5 mgm.) is given after breakfast at 8:00 a.m. A reinforcing dose of .25 mgm. is given at 10:00 a.m. Another dose of .25 mgm. is given after lunch at 1:00 p.m. If the patient does not respond when the initial dose has been increased to 1.5 mgm., it is unlikely that the drug will afford any benefit. The tablets are taken after meals or at least one and one-half hours before the next meal. The initial doses in the morning and evening must be determined empirically, but they usually range from 750 to 1500 micrograms. Finally, it is noted that if one of the drugs in this group has no effect, it is quite unlikely that any of the others will be any more effective.[1,7,8]

Rauwolfia Derivatives

In the past five years, this group of drugs has been used in this country with varying degrees of success, depending upon the selectivity of cases studied. These drugs act as mild sympathetic inhibitors, parasympathetic stimulators and possibly have a non-specific effect which accounts for a tendency for the patient to show an increase in appetite, to gain weight and to develop languor and a sense of well-being.[16] The various preparations are the crude root (Raudixin), the alkaloidal extract (Rauiloid, Rautensin) and the single alkaloid, reserpine (Serpasil, Reserpoid, Serpiloid). Like the veratrum compounds, these drugs are most effective as solitary agents in the milder types of hypertension. Also, if one of these preparations is ineffective, the probability is that the others will be of no avail. When effective, the blood pressure reduction is gradual and is smoothly maintained, but this probably occurs in only about 50 per cent of mild labile hypertensives.[1] It appears from the literature that these drugs have their greatest use as an adjunct to the control of hypertension with the use of the more potent ganglionic blockers.[16] As an example, they have been useful in the combined treatment of hypertension with apresoline (1-hydrazinophthalazine) and with hexamethonium. In the case of apresoline, these drugs appear to be able to help relieve the patient of the annoyance of the tachycardia that is not infrequently attendant on that drug's use. They also tend to oppose the gastro-

intestinal stasis that is a serious problem in the use of hexamethonium.

The problem of dosage varies with the individual therapist and, in general, most methods start with divided doses several times a day, although according to one report from the Mayo Clinic, there is no reason why the drug cannot be given once or twice a day.[1] The effect of the drug is cumulative, and it takes from two to four weeks before most patients show any effect. Since these drugs are often used in conjunction with the more potent hypotensive agents,[1,3,14,16] it should be remembered that if the drug is withdrawn, there may be no change in the clinical picture over a period of a week or more.[1,7] This is even true if the drug is used alone. Finally, it has been suggested by Wilkins that these drugs might be found to be of use in the stabilization of the pre-hypertensive individual; that is, one who has a labile blood pressure that tends to skirt the limits of sphygmomanometry above which the hypertensive state presumably begins.[12,16]

Ganglionic Blocking Agents

One of the approaches to the treatment of hypertension has been an effort to block the chain of impulses that lead from the cerebral cortex to the peripheral blood vessels. The chemical mediators in this system are acetylcholine and norepinephrine which transmit nerve impulses through ganglia and from nerve endings to smooth muscles, respectively. As noted above, the Rauwolfia drugs probably have their effect through an interference in this system, and in addition there are now available two agents which are clinically feasible and which act principally on the ganglia, hexamethonium and pentapyrrolidinium bitartrate (Ansolysen).

Hexamethonium is a quaternary ammonium compound and is a chemical analogue of acetylcholine. It probably acts through competitive inhibition, blocking nerve transmission through the ganglion. Besides inhibiting the sympathetic impulses it also blocks parasympathetic nerve transmission, and this is the source of its principal and unfortunate side effects. Among these are paralysis of the muscles of the eye, gastrointestinal stasis and hypotonicity of the bladder.[9,13,14] The last two are especially embarrassing, for the effectiveness of oral administration will depend on normal intestinal activity and uneven absorption will obviously impair the effectiveness of therapy. The creation of urinary obstruction, besides causing acute discomfort to the patient, will have adverse effects on kidneys which are likely to already have impaired function due to hypertensive effects. These side effects often tend to become less intense as the drug continues to be used and is possibly related to the drug tolerance that is seen in its use[14] and which will be discussed shortly. It is imperative that therapy include the use of laxatives and the use of drugs like urecholine and/or prostigmine.[8,14] When the drug is used to optimal advantage, Schroeder and his group[9,13] noticed hardly any evidence of drug tolerance. However, it was their observation that if the drug was discontinued or not given properly that the patients were likely to show a return to hypertensive levels and that the control of the disease then became much more difficult. Emphasis is placed on the fact that this drug is a much more potent hypotensive agent than the ones mentioned previously and that although, because of its rapid excretion in the urine, it has to be given every four hours it is essential that every effort be made to educate the patient so that he is able to recognize the evidence of changes of blood pressure levels and adjust his dosage accordingly. Ideally, this is done by taking the blood pressure immediately preceding the next dose of medication. The pressure is measured in the sitting position. It is of interest that in the initial treatment of hypertension, using a combination of 1-hydrazinophthalazine (Apresoline) and hexamethonium, Schroeder[13] has the blood pressure taken in the supine position, and it is only when the patient is being evaluated for maintenance therapy that the readings are taken in the sitting position.

The dosage schedule of hexamethonium as shown here is the one recommended by Schroeder's group and is given in combination with Apresoline.[13] The patient is started with 125 mgm. every four hours, and this is increased every day by 125 mgm. a dose till 500 mgm. per dose is being given. At this time, Apresoline is started at 25 mgm. every four hours and increased every day by 25 mgm. a dose until 100 mgm. a dose is being given. After this, the dose of hexamethonium is controlled by the blood pressure (systolic) level as follows: over 140, full dose; between 140 and 130, ½ dose; between 130 and 120, ¼ dose; below 120, no medication. The Apresoline itself is continued regardless of the

blood pressure and is only discontinued if the patient starts to show toxic reactions to that drug of an uncontrollable degree. When hexamethonium is used alone, the dosage as recommended by Hoobler[7] starts out with 125 mgm. after meals and at bedtime and increases to 750 mgm. per dose as required until at least a systolic pressure of 160 to 180 or preferably of 110 to 120, standing, is attained. A daily laxative is given. If a sphygmomanometer is unavailable, the patient is instructed to stand motionless for one minute before each dose and, if dizziness occurs, the intended dose is halved. Rauwolfia is used concomitantly and occasionally Apresoline. Also, if constipation is present for twenty-four hours, the medication is halted until a bowel movement occurs. In acute emergencies, the drug may be given intravenously at the rate of 1 mgm. per minute. Early in the control of hypertension with this drug, it is recommended that the patient be given the drug parenterally in doses of 5 mgm. every two to four hours and that a rigid control of the blood pressures be taken with variation of succeeding doses depending on the response of the patient. Care should be exercised to avoid excessive falls of blood pressure for fear of further compromising renal blood flow, reducing glomerular filtration rate and impairing the excretion of the drug. Since this drug has such a strong hypotensive action, there has been some degree of dissention about its use in patients with uremia[7] and in those with generalized arteriosclerosis. The limits of uremia beyond which one should proceed with real caution have been set at about 60 mgm. per cent of non-protein nitrogen. This also applies to Ansolysen.

Recently, there has become available in this country another ganglionic blocking agent which seems to offset some of the disadvantages of hexamethonium. This is pentapyrrolidinium bitartrate which will be referred to by its trade name of Ansolysen. It is five times more active than hexamethonium in producing block,[5,14] and the average duration of action is about 40 to 46 per cent longer than with hexamethonium.[5] Given intravenously, whereas hexamethonium is apt to cause a precipitous fall in blood pressure, the response to Ansolysen proceeds more gradually over a ten-minute period. Although this does permit some tendency to exceed the effective dose, this can be counteracted to some extent by having the patient sit up in bed and noting the appearance of hypotensive effects. The mean effective oral dose is about twenty times the effective parenteral dose and is thus somewhat similar to the relationship existent with hexamethonium. However, the predictability of response is much better and more rapid than with hexamethonium in that there is a demonstrable effect in one hour after an effective dose.[5] There is also less daily variation and the extent of tolerance is less than that shown with hexamethonium.[5,14] The degree of cross tolerance between the two drugs is so slight that if a patient were changed from one drug to the other, i.e. from hexamethonium to Ansolysen, the mean effective dose would vary so slightly as to be clinically insignificant. Although the potentiating factors that affect the action of drugs like these are still significant, they are not as marked with Ansolysen as with hexamethonium, in that the variations of blood pressure levels produced generally are not so severe as to require the strict observation which is necessary with hexamethonium. These potentiating factors are noted to be as follows: Ambulation, prolonged standing, alcoholic intake (even a relatively small amount), heavy eating, exercise, and sweating. Along with this last, any form of salt-depleting situation, whether it is by a restricted diet or the use of mercurial diuretics, is likely to cause some embarrassment.[5] Side effects are about the same as with hexamethonium, although not so severe. Freis and associates state that many of their patients required glasses to compensate for lack of accommodation. Impotence was a frequent and troublesome side effect in the male, this being more marked in the older age group. Urecholine (urethane of B-methylcholine) was used to combat this with questionable effect. None of their patients had trouble emptying the bladder, although this is a common problem with hexamethonium therapy. Certain side reactions, like dryness of the mouth and frequent postural hypotension, cleared up after the early stages of treatment although others persisted during the course of therapy.

The therapeutic dose used by Freis[5,18] varies according to the severity of the disease. A combination of Neostigmine, Reserpine and Ansolysen is recommended. Table III is published by Wyeth.[18] Because of Ansolysen's prolonged effect, the drug is given only three times a day at roughly eight-hour intervals instead of every fourth hour as in the case with hexamenthonium.

TABLE III. ORAL DOSAGE SCHEDULE

NOTE: When the desired reduction in blood pressure is achieved, dosage of Ansolysen is stabilized and no further increases are made. Each patient is evaluated independently and the dosage schedule is deviated from freely as required by the response of the patient.

Hypertension Type	Drug	1st Week	2nd Week	3rd Week	4th Week	5th Week	6th Week	7th Week
Mild, labile	Reserpine	0.5 mg. b.i.d. for 2 to 3 weeks. Dosage may then be reduced to 0.5 mg. or less daily, depending on therapeutic response. As little as 0.1 mg. daily may be sufficient.						
Moderate to severe	Neostigmine*—upon arising Reserpine—1st dose before breakfast 2nd dose 5 p.m. Ansolysen—1st dose after breakfast 2nd dose mid-afternoon 3rd dose before bedtime	0 0.5 mg. b.i.d. 0	15-30 mg. 0.5 mg. b.i.d. 20 mg. t.i.d.	15-30 mg. 0.5 mg. b.i.d. 40 mg. t.i.d.	15-30 mg. 0.5 mg. b.i.d. 60 mg. t.i.d.	15-30 mg. 0.5 mg. b.i.d. 80 mg. t.i.d.	15-30 mg. 0.5 mg. b.i.d. 100 mg. t.i.d.	15-30 mg. 0.5 mg. b.i.d. 150 mg. t.i.d.
Severe or malignant	Neostigmine*—upon arising Reserpine—1st dose before breakfast 2nd dose 5 p.m. Ansolysen—1st dose after breakfast 2nd dose mid-afternoon 3rd dose before bedtime	15-30 mg. 0.5 mg. b.i.d. 20 mg. t.i.d.	15-30 mg. 0.5 mg. b.i.d. 40 mg. t.i.d.	15-30 mg. 0.5 mg. b.i.d. 60 mg. t.i.d.	15-30 mg. 0.5 mg. b.i.d. 80 mg. t.i.d.	15-30 mg. 0.5 mg. b.i.d. 100 mg. t.i.d.	15-30 mg. 0.5 mg. b.i.d. 200 mg. t.i.d.	15-30 mg. 0.5 mg. b.i.d. 300 mg. t.i.d.

*If ineffective, take a laxative at bedtime.
Schedule used by E. D. Freis, M. D., personal communication, as printed by Wyeth (18).

As a final note on the use of this drug, it was found that if the constipation was not controlled by the neostigmine, then it would be best that the drug be withheld till the patient has had a bowel movement. Although syncopal attacks are seen with this drug, the prolonged collapse reactions often accompanied by ileus are not seen as they have been with hexamethonium. Schroeder[11] mentions the use of Ansolysen as a substitute for hexamethonium and states that preliminary observations in his small group were such as to suggest that it may be more effective in providing control. (As noted above he uses a combination of Apresoline and a ganglionic blocker, viz. hexamethonium). Smirk[14] reports that of eighty patients who had been on Ansolysen alone and had not been doing well, sixty benefited by the addition of reserpine 0.5 mgm. twice or three times a day. In these cases, the blood pressure was under better control or there was further freedom from side effects. Late toxic effects with Ansolysen have not been reported. However, in his observations on treatment of hypertension with Apresoline and hexamethonium, Schroeder[9,13] reports the appearance of an acute interstitial fibrosis of the lungs occurring in five of his patients, which was rapidly fatal. Four of these were Negroes, four were males, three had congestive heart failure, and three had renal insufficiency. All had the malignant phase of the disease, and it was felt that the hexamethonium ion may have been the offending agent in this group.

1-Hydrazinophthalazine

This drug is marketed under the name Apresoline and will be referred to as such in the following comments. It is the most effective of the phthalazine compounds and may be classified as a potent hypotensive drug. The mode of action is obscure, but it does seem to locate its action more or less directly on the blood vessels. Experiments have been reported wherein the drug was injected into the femoral artery causing vasodilatation on the injected side while the blood vessels on the contralateral side were unaffected.[12] Whether the mode of action involves some humoral agent or affects an enzyme system concerned with vasoconstriction is not known. While it lowers blood pressure, it also increases renal blood flow and increases cardiac output.[15] It may also cause tachycardia.[15] It may cause an increase in the urinary excretion of sodium. It is interesting to note that pherentasin, a pressor substance obtained from extracts of hypertensive blood, is no longer pressor when treated with this drug.[12] The hydrazine grouping is responsible for this activity. In man, the hypotensive effect may last several hours after injection. The rate of excretion is rapid and effective utilization has been based on frequent two- to four-hour doses.[13,15]

The hydrazines are anti-histaminases *in vitro*, and the side effects seen with these drugs are probably related to the fact that the histamine-destroying enzyme is inhibited.[12] The milder reactions are quite numerous and include lassitude, coryza symptoms, nausea and vomiting. Some patients show a slight fever, back pain, generalized malaise and prostration while on the drug, and recovery upon removal from its influence. Although this sort of reaction usually appears shortly after the start of therapy, it may not appear for two or three weeks. Another unusual effect is the occasional appearance of a "glove and

stocking" type of paresthesia which shows up with the administration of high doses but which is relieved upon lowering the dose of the drug.[9] Severe exacerbation of neurodermatitis has been reported and angina pectoris can be made worse. In one case observed by the writer, the patient had been on the drug for about a week and suddenly developed marked tachycardia, increased angina and a protodiastolic gallop. The drug was immediately stopped, and the patient completely recovered in about twelve hours. The reaction can be more severe, and the electrocardiographic changes noted suggest a state of ischemia.[9,13,15] After the patient has been on the drug for about a month, the cardiac output drops towards normal and there is a decrease in palpitations and tachycardia. If the dose is increased, there is likely to be a return of symptoms. Of the group treated by Schroeder et al,[9,13] thirty-five had suffered a coronary occlusion before onset of treatment. On Apresoline and hexamethonium therapy, thirty-two were evaluated for this factor, the other three patients not being included because of either discontinuance of therapy, sudden death, or recurrence. There were no further attacks in the remaining thirty-two. In the rest of the group being studied, there were occasions of cardiac involvement ranging from electrocardiographic changes to actual attacks, three fatal and three non-fatal.[11]

Four patients who showed the electrocardiographic changes of bundle branch block and subendocardial ischemia, showed their reactions during induction of control. Of significance, though, is the finding that in the smaller control group, there were three deaths and two non-fatal attacks. Sudden deaths, possibly of cardiac cause, occurred three times in the treated patients and ten times in the controls. Of ten patients who suffered from angina, eight are asymptomatic, one requires nitroglycerine about once a month as compared to a former need of six to eight times a day, and the one patient that discontinued treatment still has his angina unrelieved.[11]

Late toxic reactions are apparently related to the creation of a collagen-type of disease.[9,12] Among the first symptoms is a polyarthralgia which may be indistinguishable from acute rheumatoid arthritis. It is interesting that the thymol turbidity and cephalin flocculation tests are positive, while the bromsulfalein test is normal. Following this, the patient develops a syndrome suggestive of disseminated lupus erythematosus. The "L.E." cell test may be positive. Reduction of the dose may improve the arthritis but the "lupus" occasionally progresses. Apparently, this phenomenon is relatively rare, and Schroeder mentions that in his experience he has not found it to be a contraindication to the use of the drug in severe and malignant hypertension. As to the mechanism of action, it is hypothesized that it may be the result of true drug sensitivity, or allergy, or from depletion of some necessary trace metal, coenzyme or other substance.[12]

The drug, as used alone, is generally ineffective, although in a few patients it has been shown to induce a very satisfactory state of hypotension. Moyer[10] starts his treatment with 25 mgm. at mealtimes and at bedtime. After a week or so, the breakfast and night doses are increased to 50 mgm., and after several days the noon and evening doses also are raised to 50 mgm. Using such a regime, thirty-five per cent of patients showed a good response after three months, but at the end of two years only 9 per cent of the patients still had adequate blood pressure regulation. Stunkard[15] reports a higher figure of favorable response, about 70 per cent, but his series ran for a shorter period of time. The dose schedule used was 10 or 25 mgm. every four hours from 6:00 a.m. to 10:00 p.m. This was increased by 10 or 25 mgm. increments until blood pressure responses had been met or side effects limited dosage. The average daily dose was 530 mgm. (range 250-1000 mgm.). The schedule, as used by Schroeder and his group, has been already listed in the discussion on hexamethonium.

Sympatholytic Agents

There are available several agents in the pharmacopeia which act by blocking the action of epinephrine and/or norepinephrine without blocking the transmission of impulses at the neurovascular junction and also drugs which induce a total adrenergic blockade. Unfortunately, none of these drugs has enough consistency of action, significantly minimal side effects or prolongation of action to warrant their use in long-term antihypertension therapy. The most important ones are as follows:

Benzodioxane and regitine are used primarily in the diagnosis of pheochromocytoma-induced hypertension. They are short acting and tend to produce tachycardia.

Dihydroergotamines show favorable though transient effects on hypertensive states. Unfortunately, they cannot be taken by mouth. The B-alkylamines, especially dibenamine and dibenzyline, are useful drugs since they are very effective in blocking the effect of epinephrine. However, the small percentage of patients that respond, the high level of distasteful side reactions and the fact that dibenamine is practically non-effective by mouth have led to the preferential use of other drugs.[2]

Summary

1. A brief review of the types and degrees of essential hypertension is presented. When the physician has completed his differential diagnosis, it is necessary to come to some conclusion as to the degree of hypertension present for upon this decision a rational approach to drug therapy can be made.

2. Some of the more important and common drugs are discussed including their indications, contraindications and limitations.

3. At present, there is no ideal hypertensive agent, i.e. a drug which will satisfactorily lower the blood pressure without concomitant obnoxious side effects.

4. The problem of combating hypertension should be met with optimism for with information and skill the present-day physician has at his command the wherewithal to apply effective treatment in a great many of his cases.

5. With the limitations of available drugs, the physician should not hesitate to use combined therapy, for in such an approach very often lies the goal of maximum good. Except for a certain number of mild hypertensives, there is no one drug available which will adequately treat hypertension.

Acknowledgment

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ADENOTONSILLECTOMY

(Continued from Page 462)

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Laboratory Aids

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LEUKEMIA OR LEUKEMOID REACTION?

JOHN D. LeMAR, M.D.
Fargo, North Dakota

THE QUESTION posed in the title of this report is one that plagues every physician from time to time, especially internists and pediatricians; the pathologist is usually called on to make the differentiation when such a question arises. On the one hand, a diagnosis of leukemia presently carries a death sentence, while on the other, a leukemoid reaction, which may very closely simulate dreaded leukemia, usually carries a good prognosis.

In attempting to settle this question, the physician must keep a number of things in mind. The first of these is the fact that a great increase in the number of leukocytes, with the appearance of immature cells in one or more series, does not necessarily spell leukemia. Certain conditions may give rise to high levels of granulocytic cells, sometimes with decided immaturity. Among these are the various hemolytic anemias, concerning which mistakes are often made. Leukocytosis following severe hemorrhage may mock leukemia, and there are a host of infections that sometimes do the same thing, particularly pneumonic and bacteremic states. How often has the leukemoid phase of Hodgkin's disease been called leukemia, and how many times have marrow-destroying diseases been missed because of the leukemoid pattern produced by such diseases in the peripheral blood? Pediatricians and other physicians caring for young children are particularly disturbed by diseases accompanied by lymphocytosis and closely resembling lymphocytic leukemia. The high lymphocyte counts of pertussis have been miscalled leukemia many times, and physicians have been repeatedly fooled by so-called infectious lymphocytosis. Infectious mononucleosis can so closely mock leukemia that only a skilled microscopist can separate them, and even he may need the help of other laboratory studies.

The second thing the physician should keep in mind is that the present-day diagnosis of leukemia usually is not made from a study of smears of peripheral blood alone, except in cases of the most obvious and flagrant disease. Other studies are needed, of which the most important is study of the bone marrow. This is a form of biopsy and it is as important to the practice of hematology as is surgical biopsy in the practice of surgery. It establishes a diagnosis in the case of granulocytic leukemic states and rules out other conditions resembling leukemia. It may not be so valuable in lymphocytic leukemia and lymphocytic leukemoid reactions, for occasionally the marrow is not involved in lymphocytic leukemia until relatively late in the disease. In the vast majority of cases, however, the bone marrow has become involved by the time the patient becomes subjectively ill.

Some physicians contend that a diagnosis of leukemia should never be made without confirmatory studies of the bone marrow or biopsy of a lymph node. The study and interpretation of bone marrow are highly specialized procedures. One must have properly interpreted studies of bone marrow to differentiate leukemia from similar states. If the physician cannot do this himself, he can at least learn to make reasonably good preparations of bone marrow and send them to the pathologist; better yet, he can refer the patient to the pathologist for hematologic studies. A detailed history is particularly necessary to the one who must interpret the bone-marrow picture.

The third thing the physician must remember

Dr. LeMar is pathologist at the Fargo Clinic.

This is the twenty-ninth in a series of editorial reports sponsored by the Minnesota Society of Clinical Pathologists and designed to foster closer relationships between clinicians and pathologists.

is that true leukemia is not always an overwhelming and rapidly fatal disease. It is true that, on the average, those who have the acute forms live less than 6 months and those who have the chronic forms live about 3 years, but there are many exceptions. Leukemia is sometimes a slowly developing state and may require months or even years before manifesting itself. Several patients come to mind to illustrate this point. One was a sixty-year-old man in whom moderate lymphocytosis was found on study of routine smears for differential count. Lymphocytosis was still present a year later but the cells were mature and normal in appearance. He returned eighteen months later with an upper respiratory infection and lymphocytosis again was found. Studies of bone marrow at that time revealed dense infiltration of the marrow by immature and abnormal lymphocytes, and a diagnosis of lymphocytic leukemia was made. Today, five years later, this man is alive and feels well, although he has not received any particular treatment. Only recently has the spleen become palpable. A second patient was a forty-year-old woman who had had lymphocytosis for fifteen years before the first study of her bone marrow was made; this examination revealed only a mild degree of lymphocytic infiltration. Repeated studies of bone marrow at four-month intervals disclosed slowly but steadily advancing infiltration and now, after four years, she has fully developed and easily recognized chronic lymphocytic leukemia. A third patient had had persistent granulocytic leukocytosis for more than seven years. Studies of marrow revealed only granulocytic hyperplasia, but now he is frankly leukemic. Now and then we see patients with leukemia in whom the peripheral blood may show only anemia or pancytopenia.

The physician must bear in mind that repeated observations often are needed to establish a diagnosis of leukemia or to rule it out. New histochemical procedures, not yet generally available, eventually may prove to be of great value. In the meantime, careful observation and adequate hematologic studies will distinguish between many cases of true leukemia and their annoying benign counterparts immediately or after a short period of observation. A few cases must be studied repeatedly and for a long period before a final diagnosis can be made.

"DIRT-EATING" WIDESPREAD IN PARTS OF TEXAS

The practice of dirt-eating—called geophagia—in some areas of North and East Texas is apparently widespread, according to two Dallas radiologists.

In *Radiology* (January) they have alerted their radiological colleagues to watch for the x-ray manifestations of this unorthodox diet regimen.

Making the report are Dr. R. S. Clayton and Dr. Paul H. Goodman, both associated with the Southwestern Medical School of the University of Texas, in Dallas.

They point out that geophagia may be suggested whenever there is an unexplained increase in the radiopacity of the fecal content of the colon. "Since learning the roentgenographic findings in geophagia, we have interviewed many patients who eat dirt or who have eaten it at sometime during their lives," say Drs. Clayton and Goodman.

"We believe the practice is quite common among some females of North and East Texas. Pregnant women occasionally are known to eat dirt but all do not have the habit as frequently as others. Men seem to eat dirt only rarely," they add.

"The patient will often deny the practice unless he is assured by the doctor that no harm or publicity will result from the admission," Drs. Clayton and Goodman continue.

They add that a lack of certain essential dietary factors may cause the craving for the dirt, but they point out further there is little evidence to suggest that the eating of reasonably small amounts of dirt is in anyway injurious to humans.

"The recognition of geophagia may provide a clue to the patient's difficulties for which the roentgenographic study of the abdomen is made," the two Texas doctors conclude.

Current Concepts

THE USE OF QUINIDINE IN CLINICAL MEDICINE

SAMUEL A. WEISMAN, M.D.
Los Angeles, California

QUINIDINE is used principally in the treatment of cardiac arrythmias. Since it is a potent drug, it is important that one be well informed as to (1) its pharmacological behavior and (2) when and how to use it.

Pharmacology and Toxicity

Quinidine is a myocardial depressant. It depresses the sinoauricular node, increases the refractory period and decreases conduction time. It causes a prolongation of the P-R, QRS and S-T intervals. It is antagonistic to acetylcholine, which probably initiates the heart beat.[1] Death during the course of quinidine therapy is often due to either asystole or respiratory paralysis. Toxic reactions to quinidine vary from patient to patient and in even the same patient, so that dosage must be adapted to individual needs. Some workers have placed emphasis on blood serum levels as a yardstick for dosage. Perhaps in the proper hands and with very good facilities for measurement, such a method is safe. However, because of the great variations both in individual toxic reactions and in recommended blood serum peak levels, it would seem hazardous indeed to attempt to attain a predetermined level in all patients. Strict attention to blood serum level may leave one unwarned as to impending toxicity. Also, restoration to normal rhythm may take place hours after the peak level has been reached.

When and How to Use Quinidine

Extrasystoles, without evidence of underlying heart disease, can often be eliminated by administration of 3 grains of quinidine, two to three times a day for a few days. The ectopic centers are so sensitive to the action of quinidine that it may be given even in the presence of organic cardiac disease. When such disease is present, 1½ grains given twice daily is often effective and not particularly hazardous. In acute paroxysmal auricular tachycardia, quinidine may not be necessary at all. Pressure on the carotid sinus will terminate the tachycardia in a fair percentage of cases, or the administration of a fast-acting digitalis preparation, such as cedilanid, will often prove successful; if both fail, the use of 3 grains of quinidine every two hours will usually correct the tachycardia.

Digitalis alone often terminates an acute attack of auricular flutter and fibrillation. The flutter may be converted to fibrillation and spontaneously to sinus rhythm. Should digitalis prove unsuccessful, the use of 3 grains of quinidine every two hours will usually correct the tachycardia.

Ventricular fibrillation calls for heroic measures. It is usually a complication of coronary thrombosis of coronary sclerosis. Quinidine should be given in 3 grain doses every hour. If death appears imminent, it should be given intravenously, as recommended by Armbrust and Levine[2]: 0.6 gm. of quinidine hydrochloride with 200 cc. of 5 per cent glucose in distilled water given by slow drip over a period of about one hour, with frequent electrocardiography as a guide. The injection must be stopped immediately when normal rhythm is established or when significant disturbances in conduction occur.

My method for the treatment of chronic auricular fibrillation is based on extensive experimental studies plus the experience of many years of clinical application. It must be emphasized that a fibrillating heart is not a fully compensated one. It is 15 to 80 per cent less efficient than one beating regularly. The administration of a cardiac depressant to an already embarrassed myocardium may aggravate the condition. Therefore, it is necessary to restore the heart muscle to the optimum physiological state before quinidine therapy is started. Digitalis must be administered until the heart rate is reduced to 70 to 80 beats per minute. Once the heart is fully digitalized, a maintenance dose of digitalis must be established and continued. Quinidine therapy is then begun. The drug may be more safely given if administered in small doses with very gradual increments. The size of the dose and the rapidity of administration determine the intensity of the reaction. This aids in establishment of a tolerance for the drug so that the patient is less likely to develop toxic reactions. I advocate the schedule given in Table I.

Doctor Weisman is Clinical Associate Professor of Medicine, University of Southern California.

TABLE I

Day	8:00 a.m.	10:00 a.m.	12:00	2:00 p.m.
1	0.2 gm. (gr. 3)			
2	0.2	0.2		
3	0.2	0.2	0.2	
4	0.2	0.2	0.2	0.2
5	0.33 gm. (gr. 5)	0.33	0.33	
6	0.33	0.33	0.33	0.33
7	0.33	0.67 gm. (gr. 10)	0.67	
8	0.67	0.67	0.67	

This is a flexible schedule. At the first sign of toxicity, the schedule of the previous day (or earlier) is reverted to and the rate of increase is slowed down. If regular rhythm has not been achieved after a dose of 30 grains has been given for a few days, quinidine therapy is discontinued. When it takes more than 30 grains to attain normal rhythm, it is usually most difficult to maintain that rhythm. After normal cardiac rhythm is restored, the dose is reduced 5 grains daily until a maintenance dose of 15, 10, 5 or even 3 grains is reached. Patients can be well maintained on such a dosage together with a maintenance dose of digitalis. Digitalis and quinidine are not synergistic in their action.[3]

Since 1929 I have treated several hundred patients according to this method.[4] Rarely have they manifested toxic symptoms such as marked pallor, Cheyne-Stokes respiration, convulsions or marked drop in blood pressure. When using quinidine for cardiac arrhythmias, one cannot disregard its pharmacologic properties, the need for timely application, or the variation in individual patient needs.

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INTESTINAL OBSTRUCTION

(Continued from Page 483)

proved surgical methods, supportive treatment and antibiotics have no doubt also been important. It is noteworthy that there were no gangrenous obstructions in any of these patients, although two patients had associated perforations.

Summary and Conclusions

1. Forty-five cases of mechanical intestinal obstruction due to inflammatory strictures were seen in this clinic from January 1, 1942, to September 1, 1953.

2. Regional enteritis and diverticulitis each accounted for almost one-third of the cases.

3. Primary resection following control of distention is the treatment of choice for obstructed strictures of the bowel, except in patients with marked dilatation within the greater length of the colon; emergency transverse colostomy with complete deviation of the fecal stream is indicated in the latter group.

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Editorials

JOHN F. BRIGGS, M.D.
ARTHUR H. WELLS, M.D.
HENRY G. MOEHRING, M.D.

THE DOCTOR AND THE PRESS

There is no substitute for good public relations. This is true not only of a huge corporation, utility company, government or organization, but of every profession and agency which serves or owes some responsibility to the public.

None performs greater service to humanity than the medical profession and few have greater responsibility. Thus it would seem that a major effort of physicians and doctors should be toward developing a sound, workable plan of public relations.

It encompasses many fields at various levels.

Good public relations is a friendly liaison between doctor and patient.

Good public relations is making every use of radio, television, newspapers, magazines and other media for the dissemination of medical information that the public needs and wants to know.

We are living in a new era in the world, an era when medicine is making major inroads in diseases of all kinds, an era of miracle drugs and an era of marvels on the operating table.

The medical profession has a great story to tell, and it should be told. The public wants to know.

Further, it is my belief that the public has the *right* to know.

Surveys show that people worry and think more about their health than they do about George Gobel, baseball or war. They are being fed all kinds of information, accurate and inaccurate, about diets, proteins, cancer, heart trouble and housemaid's knee.

It is screamed at them from glaring advertisements over the radio and from TV screens.

Unfortunately, too much of it is misinformation, pure quackery or distortion, for the simple reason that whoever wrote the material didn't understand it or couldn't get a reputable medical man to "talk."

There is one great danger in peddling such misinformation. It instills fear, not common sense reasoning.

There was the case in Minneapolis not long ago where a woman, so frightened by misinformation, thought she had cancer. Without submitting to a competent medical examination, she went down into the basement and hanged herself.

A postmortem showed that *she did not* have cancer.

The medical man, I know, will agree that this is a horrible state of affairs. But hand-wringing and blistering assaults on quacks are not going to give the people the information they need.

To accomplish this will mean overcoming some historical and rather foolish barriers which have been built up in a misty past and should be relegated to the horse-and-buggy days where they belong.

One is a fear of the press on the part of the medical profession.

"The newspapers get everything wrong!"

"The stories are distorted and sensationalized!"

These are oft-repeated phrases used against public information media.

And this attitude, in turn, has built up a suspicion of all medical men among members of the Fourth Estate.

It is ridiculous.

Upon occasion, when medical men and newsmen have gotten together to air their problems, it is amazing how these barriers have vanished. Such, I am happy to say, has been the case in Ramsey County and in out-state Minnesota during recent years. Doctors and newsmen have been sitting together and talking things over. And a new feeling of mutual respect has been inculcated.

What have been the results?

Television programs, conducted by specialists in the field, on prevention and cure of tuberculosis, heart disease and cancer.

News stories, some attracting nationwide interest, of new developments in heart surgery, for example.

Stories that have been accurate, interesting, but not sensational, about new medical practices.

And all because enough doctors and newsmen were interested in one problem: How best can we tell the story of medicine to the public?

One fear of the medical profession is distortion of fact. This problem arises, mainly, when a

reporter either doesn't understand the subject or oversimplifies in presenting it.

It can be solved. A man who knows his subject well enough can present it simply and with interest. And a good reporter, dealing with a highly technical subject, shouldn't be afraid to permit his source to check the accuracy of statements and facts. But this does not give the doctor or medical scientist the right to censor grammar, punctuation or style.

News prepared for public consumption *must be clear* and *easy to read* or it's not going to be read. I, personally, feel that a lot of professions have cloaked themselves in a welter of technical "gobbledy-gook" for which there are much better four-letter words.

One more thing. The day of the alcoholic, devil-may-care newspaperman is gone. The reporter who comes to get a medical story probably is college-trained, stable and eagerly enthusiastic about doing his best. He can be trusted, and he has a code of ethics as strict as those in the medical profession.

There is another level of public relations which should be mentioned. That's the practical, day-to-day contact between the press and the doctor in covering accidents, illnesses and injuries.

Newspapermen do not want doctors to violate their sacred oath by giving away confidences between doctor and patient.

But newsmen do expect that when a doctor is asked, he will not hang up the telephone and not brush away the questions in a brusque manner. The reporter expects that the doctor will confirm reports of illness or injury, and if they are true, will explain, in broad terms, the nature of the injury.

Newspapers are never too much concerned with illness, unless the sufferer happens to be someone in the public eye or unless the illness seems to be a rarity.

Medical men should *know* that when a newspaper gets wind of that kind of story, questions will follow. And it would be a good idea if the doctor discussed the matter with members of the family so that either could have authority to speak to the press.

In the matter of what is news and what isn't, there is only one answer. Newspapermen are trained to know what is news, just as doctors are trained to diagnose and treat illness.

To tell a newspaperman that such and such isn't news is like a newspaperman telling a doctor what he's supposed to treat.

In the realm of rare diseases, I have made this suggestion several times. In order to prevent "toe stubbing" by the press and to insure accurate information on all types of illnesses, it is suggested that each county medical society draft a list of specialists in various fields. This list should be turned over to the newspaper. And when a case of suspected rare illness comes up, the newspaper can easily call the doctor in that specialty and ask him whether it is rare, unusual or not.

This problem has come up frequently in the birth of "small babies." Or relatives will call and say that "Uncle Dudley" is down with a rare disease and shouldn't we write a story about it.

Doctors, I know, have an aversion to anything that smacks of personal advertising. Newspapers respect this desire and, upon request, usually will leave out the name of the doctor concerned, although personally, I don't see where this fear of "names" has too much sound basis.

But still respecting this fear of "personal" aggrandizement, there are many public relations projects a medical society can undertake as a group.

Some of these:

1. Telling people where they can get emergency medical service, day or night.
2. Promoting visiting scientists who speak to the group.
3. Publicizing society projects, such as tumor boards, cancer and heart disease clinics. Also all the free, welfare work done by physicians in any community.

There is, as I said at the beginning, no substitute for good public relations. Tell the people what you are doing, and they will be happier and more understanding of your problems and hopes.

GARETH D. HIEBERT
Saint Paul Dispatch

PRIVILEGED COMMUNICATIONS

Physicians and surgeons are frequently called upon, in their professional capacity, to give testimony in court, and occasionally encounter the question of whether or not testimony sought to be elicited is, or is based upon, a "privileged communication" between doctor and patient. While, as a general proposition, he may safely

rely upon the advice of the trial Judge, which he may always seek when in doubt, an understanding of the rule and its ramifications should be helpful to all. The rule applies not only to physicians and surgeons, but to lawyers, clergymen, public officers (in a limited sense) and husband and wife. Consideration is given here only to the rule as it affects doctors of medicine.

The statute covering the matter (595.02 MSA) provides as follows:

"Every person of sufficient understanding, including a party, may testify in any action or proceeding, civil or criminal, in court or before any person who has authority to receive evidence, except as follows: * * *

(4) A licensed physician or surgeon shall not, without the consent of his patient, be allowed to disclose any information or any opinion based thereon which he acquired in attending the patient in a professional capacity, and which was necessary to enable him to act in that capacity; * * *"

Unless this privilege is waived, a physician cannot testify as to any information acquired by him in attending his patient. The privilege is not waived by the mere fact that the patient testifies concerning his condition while receiving treatment. The statute is for the protection of the patient, and he may waive it; and as a general rule those who represent him after his death may waive it for the protection of interests which they claim under him. A physician may testify as to the simple fact that he has attended a certain person professionally, and as to the number of his visits. Communications are not privileged if made in furtherance of a criminal purpose. Communications not made to enable the physician to act professionally are not privileged. A waiver in an application for insurance has been held not to apply to future communications. A party may consent that his attending physician may testify against him, but a statement made during cross-examination, without an opportunity to advise with his counsel and without a full understanding of his legal rights, that he has no objection to the physician testifying, should not be treated as waiver of his privilege which cannot thereafter be withdrawn. Dentists are probably not physicians within the meaning of the statute.

The testimony of a physician as to the instructions given his patient, and as to whether the patient obeyed such instructions, is within the privilege conferred by the statute. The statute applies, though the services of the physician are gratuitous. In the case of physicians making an examination to ascertain the physical ability of the individual to do a certain type of work, the information not being obtained for the purpose of treating or acting for him, is not privileged, nor is information obtained through an adverse party examination to qualify the doctor to testify, whether he prescribes for the party or not.

If a patient fails to object to a question put to his physician, which necessarily calls for testimony which is privileged under the statute, after a fair opportunity is given him to make an objection, he waives the privilege. The patient does not waive his privilege by bringing an action to recover for the injuries for which the physician treated him, unless the action is against the physician for malpractice (in which event the doctor, of course, is free to disclose in his defense all the phases of his treatment of the patient). Neither does he waive such privilege by presenting evidence in support of his claim, where such evidence is confined to matters outside his transactions with the physician. A waiver by the patient, procured by fraud or misrepresentation, should be disregarded.

Necessarily, the subject, upon which a great deal has been written, is here treated with utmost brevity and does not attempt to cover every eventuality nor to consider the individual Judge's interpretation of the Rule. To be completely safe, when in doubt—Ask the Judge!

ROBERT V. RENSCH
Judge of District Court
Saint Paul, Minnesota

DISEASE: ORAL AND EXTRA-ORAL

In providing the best care for a patient, the physician and the dentist frequently find that their interests in and duties toward the patient overlap.

Intra-oral and per-oral disease may be of local origin, to be detected and treated by either the physician or dentist. Some forms of local disease, such as dental caries and periodontal disease, are traditionally diagnosed and treated by the dentist; whereas, other conditions, such as malignant tumors, may oftentimes be diagnosed by the dentist, but almost invariably are treated by the physician. Some disorders of this region are merely local manifestations of a systemic disease,

and the alert dentist may render a great service to his patient if he detects the presence of a serious condition and refers the patient to the physician for early control of the ailment. Conversely, many symptoms in and about the mouth may be detected by or reported to the physician first, and prompt referral to the dentist may be in the best interests of the patient.

In our schools of medicine and dentistry, there is a remarkable overlapping of teaching materials, facilities, and faculties in the basic health sciences. And in hospitals, clinics, and research laboratories the teachings are welding the two professions together. There is room for an even higher level of co-ordination of efforts in the private practice of dentistry and medicine. The most cursory perusal of a few of the textbooks concerned with "oral medicine"† reveals that both the dentist and physician must give consideration to innumerable diseases manifest in or about the mouth, classified under such headings as the blood dyscrasias, infectious diseases, dermatoses, neoplasms, endocrine imbalances, nutritional deficiencies, arthritides, hypersensitivity reactions, developmental abnormalities and many other conditions, e.g., Paget's disease of bone and the xanthomatoses, which do not readily lend themselves to such classification.

Joint efforts of dentists and physicians have resulted in remarkable advances in the development of surgical techniques and ocular, facial, intra-oral and even cranial prosthetic appliances for victims of congenital anomalies, and accidental or surgical trauma. In future years, it is to be hoped that an even greater co-ordination of the practice of medicine and dentistry will result to the advantage of our patients as the members of each profession learn more of the activities, interests, and capabilities of each other.

DAVID F. MITCHELL, D.D.S.
University of Minnesota

TRAINING LABORATORY AIDES

In 1952 and 1953, an advisory group of the Council of the Minnesota State Medical Association made a special study of needs in laboratory and x-ray service throughout the state. As a direct result of this study, the University of Minnesota was asked to establish a one-year training program for laboratory aides as an attempt to partially relieve a severe shortage of trained laboratory personnel, especially in doctors' offices and hospitals and clinics in smaller communities. Through co-operative efforts of the Minnesota Society of Clinical Pathologists and the Minnesota Society of Medical Technologists, a curriculum was devised and a training program instituted in the General Extension Division and the College of Medical Sciences of the University of Minnesota in the fall of 1953.

Graduates of accredited high schools who are in the upper half of their graduating class are accepted for the program. In the fall and winter quarters, October through March, students register for formal classes in elementary basic sciences and laboratory technique at the University. These subjects include physiological chemistry, anatomy, bacteriology, basic laboratory technique, routine hematology, routine urinalysis, gastric analysis, electrocardiographic technique and techniques in blood banking. Students who successfully complete this portion of their training continue their training in the laboratories of participating hospitals under the supervision of pathologists and registered medical technologists for an additional six months. Comprehensive examinations are given at the end of the full year of training. The student who successfully completes the entire course receives a certificate from the General Extension Division of the University.

This represents an attempt to provide satisfactory training for laboratory workers at a subprofessional level and as such is an experiment. Its success will depend in a large measure on the continued interest, support, and guidance of official medical and hospital organizations.

ELLIS S. BENSON, M.D.
University of Minnesota

NATIONAL ASSOCIATION OF BOARDS OF PHARMACY

The National Association of Boards of Pharmacy is a new associate of the American Association for the Advancement of Science. In the April first issue of *Science,* the weekly AAAS journal, P. H. Costello, secretary of the NABP, writes a brief orientation about the NABP. From it, these extracts:

†Burket, L. W.: Oral Medicine. 2nd ed., Philadelphia: J. B. Lippincott Co., 1952. Thoma, K. H.: Oral Pathology. 4th ed., St. Louis: C. V. Mosby Co., 1954. Comroe, B. I., L. H. Collins and M. P. Crane: Internal Medicine in Dental Practice. 3rd ed. Philadelphia: Lea and Febiger, 1949.

Organization of the National Association of Boards of Pharmacy was effected in 1904 at a meeting of representatives of the pharmacy licensing boards of twenty-six states. This first meeting was held in conjunction with the annual meetings of the American Pharmaceutical Association. The present active membership is composed of the Boards of Pharmacy or licensing bodies of forty-five states, the District of Columbia, Alaska, and Puerto Rico. The Boards of Pharmacy in California, Florida, and New York are associate members.

The objective of the Association declared in the constitution, is to provide for interstate reciprocity in pharmaceutic licensure, based upon a uniform minimum standard of pharmaceutic education and uniform legislation; and to improve the standards of education and licensure by cooperating with state, national and international agencies and associations having similar objectives.

The Association constitutes a forum of the examining boards for the discussion of examination techniques, procedures, and all other subjects that are designed to raise the standards of pharmaceutic education and predicates registration upon the highest practical legal qualification. . . . The Association maintains a file record of all state pharmacy laws, interpretations and legal opinions of record pertaining to requirements and qualifications for licensure, and also the regulations adopted by the State Boards of Pharmacy. It has endeavored to compile annually licensure and census data to indicate by states the number of licensed persons engaged in pharmacy, how engaged, number licensed, and number of pharmacies in operation, and, as a service to the membership, to disseminate this information along with other current information related to the education and licensure of pharmacists, examination procedures, trends in education and legislation pertaining to pharmacy licensure requirements. This material is found in the *Proceedings,* which has been published annually since the Association was founded, and in the NABP *Bulletin,* a bimonthly publication. . .

Recommendations made by the Association with respect to subjects, scope, and length of the examinations that are given to applicants for licensure in all states have been accepted by the membership and have fostered a degree of uniformity in licensing procedure. The establishment of uniformly high legal requirements or qualifications, that applicants for licensure in all states must possess, is due largely to the program of action that has been carried out by the NABP to secure such qualifications and make reciprocal licensure more feasible. . . .

The Association does not speak for, or commit any of, its members who must act upon the applications, but the service facilitates and expedites the prompt completion of applications in complete detail, which is a matter of importance when the urgent needs of an employer, an employe, or a community for pharmaceutical service are concerned.

H.G.M.

THE RORSCHACH TEST

Since the major component of at least one-half of the conditions for which patients consult physicians involves personality factors, and since diagnosis and prognosis of psychosomatic disorders as well as their treatment are influenced to a large degree by these factors, physicians should be familiar with the use of methods of personality evaluation.

One of the most valuable methods of personality analysis is the Rorschach (ink blot) test. This test is administered by having the patient look at ten standardized cards on each of which is an ink blot. Each ink blot, in itself, has minimal conventionalized meanings, so the patient's responses to these blots actually represent functions of his own personality. With this test, a three-dimensional view of the patient's personality is obtained. This has been called a "psychogram" and has been regarded by some as resembling an x-ray of the total personality.

The Rorschach probes beneath observable behavior, and it distinguishes between superficial shock reactions and the more deep-seated character neuroses. In psychosomatic problems, it gives important diagnostic and therapeutic clues and helps to distinguish between those cases in which medical treatment should be primary and those in which psychotherapy takes the lead.

The field of application of the Rorschach technique is almost limitless. In addition to personality evaluations in connection with psychosomatic problems, the test is of value in distinguishing between post-traumatic neuroses and actual organic brain syndromes; in evaluating the person-

ality assets and liabilities of individuals being considered for promotion to executive and administrative positions in industry; in deciding the level at which psychotherapy can be pitched in organic disorders with a heavy functional overlay; and in estimating the prognosis in a vast number of personality disorders.

Like any other test, the Rorschach is not infallible. Like a leukocyte count, urinalysis, blood chemistry, and x-rays, it must be evaluated in the light of clinical findings. When so used, it could be of great assistance to medical diagnosis.

G.R.K.

SOCIAL SECURITY DISABILITY "FREEZE" PROVISIONS

The explanatory note regarding the disability "freeze" provisions of recent amendments to the Social Security Act, published herewith, provoke two observations.

Firstly, the physician is again called upon to be judge and jury in matters that pertain to his patients' incomes. Government has done this repeatedly to physicians because no one else is in a better position to judge, in this instance, the degree of disability, than the patient's physician. We must all be on the lookout for the same pitfalls that we sometimes stumbled into when patients besieged us for certificates that would enable them to get more red points, more blue points, or more gallons of fuel oil. Physicians will feel man's urge to get something for nothing from one more source with these new provisions of the Act.

Secondly, we hope that this doesn't spell a new set of forms to be filled out to certify that someone is disabled, and how. Maybe the Social Security Administration and the American Medical Association can take the same viewpoint, at least so far as using a universal certificate-of-disability-form, for which "organized medicine" has been beating the drum for a long time.

DISABILITY "FREEZE" PROVISIONS

Physicians, hospitals, and clinics will have an important part in assisting their patients to get the benefit of a new provision of the social security law which protects a worker's social security record while he is disabled.

A person who is unable to work because of mental or physical disability, or who is blind, can have his social security earnings record "frozen" under the new law.

The effect of this action is similar to that of the waiver of premium in life insurance policies. It provides that the benefit payable to the person when he qualifies, or to his family in case of his death, will not be reduced because of the period in which he had no earnings.

Persons already receiving monthly old-age insurance benefits, if they were disabled for a considerable period of time before they reached sixty-five, may have their benefits increased under the new law beginning with payments for July, 1955.

The new law protects the Social Security records of people who have been in work covered by social security for five out of the ten years before they were disabled, and for one and one-half years out of the three years before they were disabled; who are unable to engage in substantial gainful activity because of a medically determinable impairment which is expected to be of long-continued or indefinite duration; and who apply to have their records frozen while they are disabled and after they have been disabled six months or more.

A determination that a person is disabled must be based upon medical evidence. The patient himself is expected to secure the initial medical evidence; therefore, he will frequently request a summary of the history, clinical findings, and treatment of his case from his physician or medical facility. In other cases, the request, along with a release signed by the patient, may come from the state agency responsible for the determination of disability, or from the Social Security Administration.

The Social Security Administration hopes that many applicants can be returned to productive work through vocational rehabilitation services. Work in connection with rehabilitation services or in a "sheltered workshop" will not prevent a finding of current disability.

H.G.M.

MOTOR VEHICLE ACCIDENTS— A KILLER OF MINNESOTA CHILDREN

Accidents are the No. 1 killer of Minnesota children. During the past several months, through a series of articles in MINNESOTA MEDICINE, your attention has been focused upon a number of "killers." These have included poisons, suffocation, strangulation, aspiration of foreign bodies, et cetera. In this month's copy, you are urged to peruse Mr. Larimer's data on motor vehicle accidents among Minnesota's children.

In the past five years, 645 children died from motor vehicle accidents in Minnesota. This is a terrific toll of human life. Too many occurred among preschool and grammar school children: as pedestrians, on bicycles, on school buses and as occupants of moving vehicles. Not enough is done by physicians by way of safety education.

Are you using the "new safety vaccine?"

TAGUE C. CHISHOLM, M.D.

President's Letter

THE AMA MEETING

The 104th annual meeting of the American Medical Association is past history. The Minnesota State Medical Association may well be proud of its delegates in their participation in the deliberations of the House of Delegates and reference committees.

Both Dr. Martin's and Dr. Hess' addresses were scholarly and competent in their presentation and recommendations as to the problems facing the medical profession today. I feel sure that the leadership of Dr. Hess will be vigorous and forthright, and under such leadership, the affairs of American medicine are in good hands.

Dr. Cline's report regarding osteopathy was detailed and showed much effort and study. Its value does not necessarily lie in its recommendations, but in the deficiencies that were brought to light in the osteopathic educational system. But it was obvious to most that the element of cultism still exists. The action of the House of Delegates in not accepting the report and in continuing the study of osteopathic problems is in the best interests of the public and the medical profession.

The reference committee on insurance and medical service had a stormy and informative session. The informal discussion again pointed out to me the necessity for medicine to take a firm hand in guiding the future course of medicine in solving the economic problems of the profession.

Again the importance of adhering to basic principles in the furnishing of medical care was emphasized, if the American public is not to sacrifice good medical care for political expediency and minority clamor.

The problem of medical ethics as it pertains to dispensing of drugs was also heatedly discussed, and the action taken was in the best interests of all.

Public reaction to the theme of the presidential installation ceremonies, "Medicine's Proclamation of Faith," was very favorable. At these ceremonies a beloved Minnesota physician received the Distinguished Service medal of the American Medical Association for the year 1955, and every Minnesota physician may be proud of this distinction. We congratulate Dr. Donald C. Balfour of Rochester on this well-deserved honor.

The scientific program and the scientific and commercial exhibits all combined to make the annual session one of unusually high quality. It was a pleasurable experience to be able to participate in the deliberations. I feel that definite advances were made in American medicine.

Arnold O. Swenson

President, Minnesota State Medical Association

Medical Economics

Edited by the
Committee on Medical Economics,
Minnesota State Medical Association
George Earl, M.D., Chairman

AMA SESSION: DEMOCRACY IN ACTION

The 104th annual meeting of the American Medical Association in June was truly a fine example of the democratic process being enacted.

It is well known and accepted that when a large policy-making body meets for debate on controversial issues, it can easily become bound up in parliamentary snarls of many kinds which, if allowed to remain confused, can be extremely difficult to resolve.

However, the AMA House of Delegates was a striking example of avoiding such snarls, while allowing full and complete opportunity for discussion and deliberation on all issues.

One such case was the report of the famous Cline committee to study the relations between medicine and osteopathy. (For a full report of the results of this discussion, see the summary of the AMA session elsewhere in this issue.) The report itself, twenty-five pages long, was not read on the floor of the House, but it was referred to a reference committee for study and recommendation. The report made several recommendations which, if adopted, would change some basic principles of the medical profession. Full debate and discussion on these issues was held for several hours in the reference committee hearing, and freedom of speech was in no way limited, for all those who wished so were accorded full opportunity to be heard.

But, the democratic process did not end there. The reference committee itself brought both a majority and a minority report to the floor of the House, and open debate was again held on all the major issues involved. The importance of the minority view in America was seen in its full impact when the lone minority member of the reference committee clearly stated his reasons for objecting to the majority view. And, following an extensive and intensive discussion, the House voted to substitute the minority report for that of the majority report.

It is obvious that what could easily have been a confusing and difficult situation, became a clear-cut issue, and exemplified every American's right to be heard and to make known what he thinks is right or wrong, regardless if he is or is not in accord with the majority view.

Officials State Sound Policies

Dr. Walter B. Martin, then AMA president, addressed the House of Delegates at its opening session, and brought to the delegates a message containing many sound statements regarding medicine's responsibilities and problems. He noted that medical education is one of medicine's chief concerns these days. He said:

"We have a great heritage and one that must be preserved and passed on to those who come after us. Medical education has advanced in this country because it has been free and we must keep it free. For this reason the American Medical Association has opposed federal aid to medical education in any guise that would make possible federal interference or control."

He noted that numerous proposals have been made and plausible arguments have been advanced by eager advocates of federal participation in the financing of medical schools. But, he warned:

"These arguments, however, have not dispelled the justifiable fear that some degree of federal influence and control would follow federal financial aid in meeting the operational budgets of medical schools. These objections, however, do not pertain to one-time federal grants to medical schools for new construction or for reconstruction of old buildings."

Physicians Should Help

Dr. Martin cited the need for practicing physicians to do all they can to help finance better medical education, and thus help improve the medical care of the people. He stated:

"Since the financial needs of medical education are real and urgent, other means are being sought, and must be found, for satisfying these needs. One of the greatest contributions that can be made to medicine and to the public good by American physicians is the swift and adequate financial support of medical education. In certain states the response of our profession has been very fine, but these areas have been all too few. If we are to prevent the entrance of political influence into medical education, we must act promptly and effectively and on a broad front."

Hess Lauds Leaders

Dr. Elmer Hess also spoke to the House of Delegates as president-elect of the Association. He noted the fine quality of leadership in state and county medical societies all over the nation, as he had witnessed them during his travels. "I found these men to be vigorous, alert individuals, full of good ideas and boundless energy," he said. "So long as we maintain such quality of leadership in our county and state societies, the American people will continue to get the best medical care this world has ever known."

Mental Health Needs Cited

Dr. Hess told the delegates that one of the greatest medical problems in the United States today is that of mental and emotional illness. "Leading psychiatrists believe that at least 50 per cent of all patients who come to physicians' offices have a mental or emotional disturbance along with their physical disability," he noted. "And because at least half of our patients seem to fall in this category I think that mental health becomes automatically a concern of all practicing physicians—not just the psychiatrists."

Physicians Should Lead

Dr. Hess advised American doctors to take the lead in helping to alleviate this problem, saying:

"In my book, the nation's physicians should be the leaders in any campaign to overcome the ravages of mental illness. Great numbers of mental patients could be returned to useful, productive lives if they receive the proper medical as well as psychiatric treatment. Instead, today we have a system of understaffed, overcrowded institutions in which the mentally ill have little hope for cure—they are virtually tossed on a human junkpile."

Dr. Hess outlined specific ways in which physicians could work to improve the situation: take an increasingly active part in the development of more psychiatric units in general hospitals; give one day a week to work in state or county mental hospitals near their homes; aiding in development of residency training programs for nonpsychiatric residents in state mental hospitals; encouraging state and county societies to establish psychiatric consultation services for their general physician members; and aiding in reawakening the interest of communities in the public and private mental hospitals.

Another serious problem facing us, Dr. Hess said, is the medical care of the low income, no income group. He went on: "Although more than 100 million of our citizens have voluntarily availed themselves of insurance protection against the cost of illness, there are many of our citizens who cannot afford to purchase even the most modest type of coverage. These include the unemployables, the older people who live on very small pensions and those who cannot improve their economic status no matter how they try." He continued:

"Traditionally, the physicians have provided free medical service to those who could not afford to pay. However, someone must also look after their hospital care, and I believe that is the responsibility of taxpayers in the local communities. As taxpayers also, we physicians have a double responsibility. Through our state and county medical societies we must provide the leadership to develop adequate state and county public hospital care programs for the low income, no income group of our citizens. We should intensify our efforts in this direction."

Safety Program Urged

Dr. Hess also emphasized the problem of highway accidents as a major concern of the medical profession. He called the automobile a lethal weapon—one that should only be placed in the hands of those who are mentally and physically qualified to drive. "There are many license-carrying motorists today who are temperamentally unfit to drive; they should be weeded out," Dr. Hess declared. "It is ironic that in an age of great medical achievements, aimed at prolonging life, we can be so apparently indifferent to the havoc which results on our streets and highways because of sloppy and arrogant driving."

Threats to Freedom

Dr. Hess noted the many fields in which medicine has become more concerned over threats to freedom in medicine. He noted that the profession has fought hard against such obvious threats as national compulsory health insurance and the numerous fringe measures, and noted, too, that the profession has begun to recognize the socialistic dangers presented by the constant expansion of existing federal medical care plans. The House applauded his next statement:

"However, it is not enough for physicians to be concerned over threats to freedom in medicine. Nor is it enough for businessmen, industrialists, workers, or teachers to be aroused only when their own spheres of activity are menaced by proposals for increased government

control. All of us, in all social and economic levels of American life, should join together in an outspoken protest against a way of living that is entirely foreign to our fundamental principles of government."

ECONOMIST FORECASTS U. S. IN 1960

J. Frederic Dewhurst, head of the research staff of Twentieth Century Fund, has recently projected a look into what the U. S. economy will be five years hence. According to a recent issue of *Time* magazine, his key prediction, based on the assumption that peace and prosperity will continue, is that 1960's gross national product will be $413.5 billion, up 29 per cent from 1950, 16 per cent from 1954.

Noting especially an increase in almost every phase of American life, Mr. Dewhurst predicted a 16 per cent population growth, 69 million jobs which is 7.5 million more than in 1950, cultivation of 35 million acres of new crop land, an increase in gross private savings and a before-tax per household income of $6,180 average.

Needs Outlined

However, in all these increases and in the apparent prosperity trends, the nation's needs were outlined as difficult to pin down. Dewhurst's researchers tried to calculate how much more money would have to be spent to reach a "standard of living at a health and decency level." As difficult as this is to figure, the economists figured that 1950's gap between needs and supply—$13.1 billion, or 6 per cent of expenditures—would be slashed to $11.4 billion in 1960, only 4 per cent of expenditures.

And, a surprising thing of importance to the medical profession, is this prediction: "The figures showed changes in types of shortage. Housing accounted for 30 per cent of 1950's unavailable needs, only 12 per cent of 1960's. But more than half of the 1960 gap will be a shortage of medical care v. 36 per cent in 1950."

Accounting for this change will be extremely difficult, at best, and meeting those expected needs will be a great challenge, not only to the medical profession, but to all Americans as well.

The causes of health and therefore the factors important to its evaluation and management are often to be found in the individual's personal and community environment.—WARD DARLEY, M.D., *J.A.M.A.*, April 30, 1955.

THE MINNESOTA STATE BOARD OF MEDICAL EXAMINERS

230 Lowry Medical Arts Building
Saint Paul 2, Minnesota

F. H. Magney, M.D., Secretary

Minneapolis Man Sentenced on Abortion Charge

Re: State of Minnesota vs. William V. Smith

On May 16, 1955, William V. Smith, 40, 227 Ridgewood Avenue, Minneapolis, who stated he is employed as a promotional manager for a Minneapolis hearing aid company, was sentenced by the Hon. Theodore B. Knudson, Judge of the District Court of Hennepin County, to a term of not to exceed four years in the State Prison at Stillwater for the crime of abortion, the sentence being stayed, however, and the defendant placed on probation for a period of three years. On April 4, 1955, Smith entered a plea of guilty to an information charging him with having aborted a twenty-two year-old unmarried Minneapolis woman on February 6, 1955. The patient became ill the day after the abortion was performed but did not seek medical care until a month later at which time she entered Minneapolis General Hospital on the advice of her physician. According to signed statements given by both the defendant and the woman who submitted to the abortion, the defendant was instructed by her in regard to how the abortion should be performed and the catheter that was used by Smith in doing the abortion was furnished by her. The defendant, who admitted he had no scientific training except for having taken biology in high school and zoology in college, claimed that he had no previous experience with abortions.

When the defendant was asked by the Court what prompted him to commit this abortion, inasmuch as it appeared that he did not charge any money for his services, he replied that he "tried to be a friend in need." Judge Knudson then asked him if he didn't feel that he had to be discriminating in this as well as in anything else and Smith replied that he now realizes that he made a "horrible mistake." Judge Knudson then warned the defendant that if he violated any of the terms of his probation he would have to serve his sentence in prison.

First Prosecution Under Minnesota Physical Therapy Law Results in Conviction of Rochester Woman

Re: State of Minnesota vs. Edith Lundeen

On June 14, 1955, Edith Lundeen, R.N., entered a plea of guilty in the District Court of Olmsted County at Rochester, Minnesota, to a charge of representing herself as a physical therapist without having a valid existing certificate of registration, and she was sentenced to pay a fine of $250.00. However, $150.00 of the fine was suspended by the Court and the defendant actually paid a fine of $100.00. Miss Lundeen had previously pleaded not guilty to the charge when she was arraigned on June 6, 1955, but as stated above, she changed her plea to guilty, thereby making a trial unnecessary. According to Olmsted County officials, Miss Lundeen is now attempting to sell her equipment and has painted over the letters "Ph.T.," which she formerly displayed in front of her home near Rochester. The defendant has also at various times been listed as a physical therapist in the classified section of the Rochester telephone directory.

The records of the Minnesota State Board of Medical Examiners show that in 1934 Miss Lundeen maintained an office in the Lawler Building in Rochester and that according to an advertisement, she was a graduate in physiotherapy, specializing in the treatment of arthritis, myositis and neuritis. At that time, even

(Continued on Page 530)

AMERICAN MEDICAL ASSOCIATION

Proceedings of the House of Delegates

104th Annual Meeting

Osteopathy, medical ethics, medical practices, intern training, hospital accreditation and polio vaccine were among the major topics of discussion by the House of Delegates at the American Medical Association's 104th Annual Meeting held June 6-10, 1955, in Atlantic City.

Elected unanimously as president-elect for the coming year was Dr. Dwight H. Murray, general practitioner of Napa, California, who has been a member of the AMA Board of Trustees for ten years and its chairman for the past four years. Dr. Murray will become president of the American Medical Association at the June, 1956, meeting in Chicago, succeeding Dr. Elmer Hess of Erie, Pennsylvania. Dr. Hess took office at the Tuesday evening inaugural program in Atlantic City's Convention Hall.

The House of Delegates voted the 1955 Distinguished Service Award of the American Medical Association to Dr. Donald C. Balfour, surgeon, author and researcher of Rochester, Minnesota, for his outstanding contributions to medicine and humanity. Dr. Balfour has been with the Mayo Clinic since 1907 and he also has been associate director and then director of the Mayo Foundation for Medical Education and Research. His son, Dr. William Balfour, accepted the award for his father at the Tuesday inaugural program.

The Osteopathic Issue

The Reference Committee on Medical Education and Hospitals submitted two reports after considering the recommendations of the Committee for the Study of Relations Between Osteopathy and Medicine. The minority report, which was adopted by the House of Delegates, said:

"One member of the Reference Committee was completely satisfied that an appreciable portion of current education in colleges of osteopathy definitely does constitute the teaching of 'cultist' healing, and is an index that the 'osteopathic concept' still persists in current osteopathic practice. Since he cannot with good conscience approve the recommendation that doctors of medicine teach in osteopathic colleges where 'cultism' is part of the curriculum, he respectfully makes the following recommendations to the House of Delegates:

"1. That the report of the Committee for the Study of Relations Between Osteopathy and Medicine be received and filed; and that the Committee be thanked for its diligent work, and be discontinued.

"2. That if and when the House of Delegates of the American Osteopathic Association, their official policy-making body, may voluntarily abandon the commonly so-called 'osteopathic concept,' with proper deletion of said 'osteopathic concept' from catalogs of their colleges; and may approach the Trustees of the American Medical Association with a request for further discussion of the relations of Osteopathy and Medicine, then the said Trustees shall appoint another special committee for such discussion."

The majority report of the reference committee, which was rejected by the House, made the following recommendations:

"Your Reference Committee after a study of the report of the Committee for the Study of Relations Between Osteopathy and Medicine and the study of other evidence submitted is not completely satisfied that the current education in colleges of osteopathy is free of the teaching of 'cultist' healing.

"In view of the desire to elevate the standards of teaching in colleges of osteopathy, your Reference Committee recommends approval of the recommendation of the Committee that doctors of medicine may accept invitations to assist in osteopathic undergraduate and postgraduate medical educational programs in those states in which such participation is not contrary to the announced policy of the respective county and state medical associations. Such teaching services would be ethical.

"Your Reference Committee approves the recommendation of the Committee that the House of Delegates request state medical associations to assume the responsibility of determining the relationship of doctors of medicine to doctors of osteopathy within their respective states or request their component county societies to do so.

"Your Reference Committee recommends that a committee be appointed at the discretion of the Board of Trustees to confer with representatives of the American Osteopathic Association concerning common or interprofessional problems on the national level."

Change in Medical Ethics

The Reference Committee on Miscellaneous Business dealt with ten resolutions concerning the dispensing of drugs and appliances by physicians. The following committee report was adopted by the House:

"A great many individuals appeared before your committee in the interest of several resolutions submitted to it requesting amendment to or deletion of Chapter I, Section 8 of the Principles of Medical Ethics, and the bulk of your committee's time was spent on this very important and complex matter.

"With reference to this problem, the following resolutions were considered: Nos. 7, 12, 16, 18, 22, 35, 39, 58, 62, and 73.

Your committee recommends that no one of these resolutions be adopted as submitted but does recommend deletion of Section 8, Chapter I of the Principles of Medical Ethics which now reads:

'OWNERSHIP OF DRUG STORES AND DISPENSING OF DRUGS AND APPLIANCES BY PHYSICIANS

'Sec. 8.—It is unethical for a physician to participate in the ownership of a drug store in his medical practice area unless adequate drug store facilities are otherwise unavailable. This inadequacy must be confirmed by his component medical society. The same principle applies to physicians who dispense drugs or appliances. In both instances, the practice is unethical if secrecy and coercion are employed or if financial interest is placed above the quality of medical care. On the other

hand, sometimes it may be advisable and even necessary for physicians to provide certain appliances or remedies without profit which patients can not procure from other sources.'

"Your committee recommends that the following be substituted in lieu thereof:

DISPENSING OF DRUGS AND APPLIANCES BY PHYSICIANS

'Sec. 8.—It is not unethical for a physician to prescribe or supply drugs, remedies, or appliances as long as there is no exploitation of the patient.' "

In reporting to the House the chairman of the Reference Committee explained that in the opinion of the Committee the Code of Ethics should be stated in broad principles rather than attempt to interpret principles in detail. In recommending the change in Section 8 the Committee emphasized that this section should be interpreted in line with Chapter I, Section 6, which reads: "The ethical physician, engaged in the practice of medicine, limits the sources of his income received from professional activities to service rendered the patient. . . ."

Medical Practices Committee Report

The Reference Committee on Insurance and Medical Service, which considered two Board of Trustees reports on the Report of the Committee on Medical Practices, recommended endorsement of the Board's principal conclusions and recommendations. The House of Delegates, however, adopted a substitute motion postponing action until next December. The motion also called for distribution of the entire report of the Committee on Medical Practices to all delegates, so that they can study it carefully before the 1955 Clinical Meeting in Boston.

Internship Approval Programs

The House adopted the following statement presented by the Reference Committee on Medical Education and Hospitals.

"Your Committee has reviewed the report of the Council on Medical Education and Hospitals which includes a summary of the reports previously made to the House of Delegates by the Ad Hoc Committee on Internships and are in agreement with the Council that these conclusions and recommendations are eminently sound and that they should be incorporated into the principles and policies employed by the Council in the conduct of its internship approval programs including subsequent revisions of the Essentials of an Approved Internship.

"Your Committee wishes specifically to reaffirm the following recommendations of the Ad Hoc Committee on Internships:

"1. That a continuing study be made as to what should be the content of an internship; what constitutes sound clinical experience during the internship year.

"2. That the 'one-fourth rule' be adopted: Any internship program that in two successive years does not obtain one-fourth of its stated complement be disapproved for intern training. It was pointed out to your Committee in the hearings that statistical data compiled for a period of two years indicated that enforcement of this rule would have displaced only a few interns."

Hospital Accreditation

The same reference committee considered six resolutions on hospital accreditation and presented the following statement which was adopted by the House:

"Your reference committee has reviewed all these resolutions which in principle are similar and apparently reflect a widespread dissatisfaction with the present functioning of the Joint Commission on the Accreditation of Hospitals, possibly from bilateral misunderstandings. Therefore, your reference committee recommends that the Speaker of the House of Delegates be requested to appoint a special committee to review the functions of the Joint Commission on the Accreditation of Hospitals to consist of seven members, none of whom shall be members of the Council on Medical Education and Hospitals or the Joint Commission on the Accreditation of Hospitals. This special committee should be instructed to make an independent study or survey and report its findings and recommendations to the House of Delegates at the next annual meeting. All physicians and hospitals are urged to pass on to this special committee any observations or suggestions concerning the functioning of the Joint Commission on the Accreditation of Hospitals."

Polio Vaccine

The House passed three resolutions suggested by the Reference Committee on Hygiene, Public Health and Industrial Health in connection with discussion of the Salk polio vaccine and the introduction of new methods in the treatment or prevention of disease.

The first resolution reaffirmed "confidence in the established methods of announcing new and possibly beneficial methods in the treatment and prevention of disease" and also reaffirmed "the need for the presentation of reports on medical research before established scientific groups, allowing free discussion and criticism, and the publication of such reports, including methods employed and data acquired on which the results and conclusions are based, in recognized scientific publications."

The second resolution included the following policy statements:

"RESOLVED, That the American Medical Association go on record as disapproving the purchase and distribution of the Salk polio vaccine by any agency of the federal government except for those unable to procure it for themselves and that such necessary federal funds therefore be allocated to the various proper state agencies for such purpose; and be it further

"RESOLVED, That the American Medical Association urge the Congress of the United States to allow the Salk polio vaccine to be produced, distributed and administered in accordance with past procedures on any new drug or vaccine."

The third resolution commended Dr. Salk as follows:

"WHEREAS, The physicians of this country recognize the great scientific achievement in isolating and perfecting a vaccine for the prevention of poliomyelitis by Dr. Jonas Salk; and

"WHEREAS, This vaccine is now being used to prevent

poliomyelitis among many of our children; therefore be it

"RESOLVED, That the House of Delegates express its profound gratitude to Dr. Salk and its admiration for his monumental contribution to medical science."

Miscellaneous Actions

Among a large number of actions on a wide variety of subjects, the House of Delegates also:

Commended the "Medic" television program;

Reaffirmed its previous recommendation that the United States withdraw from the International Labor Organization;

Approved the Headquarters Survey Report, which included the statement that "the only public relations program of any permanent value is the private and public relations of the individual doctor";

Expressed regret that the Hoover Commission saw fit to alter or eliminate some of the recommendations of its Medical Task Force;

Reaffirmed its opposition to extension of the Doctor Draft Law;

Recommended the creation of an AMA Committee on Geriatrics;

Warned against the danger embodied in state legislative proposals designed to restrict the entire field of visual care to the profession of optometry.

Opening Session

Principal addresses at the Monday opening session of the House of Delegates were given by Dr. Walter B. Martin of Norfolk, Virginia, retiring AMA president, and Dr. Elmer Hess of Erie, Pennsylvania, then president-elect. Dr. Martin declared that the basic philosophy of medicine has not changed and "our obligation is to bring the best that medicine can offer to the individual patient." Dr. Hess said that the nation's physicians must become leaders in a campaign to "overcome the ravages of mental illness" as well as in an "intensive campaign to eliminate the needless bloodshed" of traffic accidents.

Inaugural Program

"Medicine's Proclamation of Faith" was the theme of the Tuesday evening inaugural program, which was broadcast nationwide by the ABC Radio Network. Dr. Hess, in his inaugural address, said that "unless we are willing to give of ourselves and our faith, our science will avail us little." Dr. Norman Vincent Peale, eminent clergyman, who was guest speaker on the inaugural program, pointed out that "the drawing together of medicine and religion is a step in helping man toward proper use of his God-given potentials and qualifications."

Election of Officers

The following officers were elected at the closing session, in addition to Dr. Murray, the new president-elect: Dr. Millard D. Hill, Raleigh, North Carolina, vice president; Dr. George F. Lull, Chicago, secretary; Dr. J. J. Moore, Chicago, treasurer; Dr. E. Vincent Askey, Los Angeles, speaker of the House of Delegates, and Dr. Louis M. Orr, Orlando, Florida, vice speaker.

Dr. Gunnar Gundersen, La Crosse, Wisconsin, was named chairman of the Board of Trustees to succeed Dr. Murray. Dr. James R. Reuling, Bayside, New York, was elected to fill Dr. Murray's term on the Board. Re-elected as trustees were Dr. L. W. Larson, Bismarck, North Dakota, and Dr. T. P. Murdock, Meriden, Connecticut.

Dr. Louis A. Buie, Rochester, Minnesota, was named by Dr. Hess to succeed himself on the Judicial Council. Elected to the Council on Medical Education and Hospitals were Dr. Harlan English, Danville, Illinois, and Dr. James M. Faulkner, Boston, the latter succeeding himself. Re-elected to the Council on Medical Service was Dr. H. B. Mulholland, Charlottesville, Virginia. Elected to the same Council were Dr. A. C. Scott, Temple, Texas, and Dr. R. B. Chrisman, Jr., replacing Dr. Orr.

Dr. B. E. Pickett, Sr., Carrizo Springs, Texas, was re-elected to the Council on Constitution and By-laws, and Dr. Warren Furey was named to the same Council to replace Dr. James Stevenson, Tulsa, Oklahoma.

J. ARNOLD BARGEN, M.D., Rochester
O. J. CAMPBELL M.D., Minneapolis
GEORGE EARL, M.D., Saint Paul
F. J. ELIAS, M.D., Duluth
Delegates to the American Medical Association

TUBERCULOSIS BATTLE STILL CONTINUES

We are doing a better job in reducing the tuberculosis death rate than in reducing the number of cases. At present the annual number of reported cases of tuberculosis is declining by only 3 per cent in contrast with a 20 per cent drop in the death rate each year since 1951. Last year is the first time in our history when tuberculosis did not rank among the first ten causes of death. In spite of this good showing we have not won the battle against tuberculosis. We will not have won it until we achieve comparable success in reducing the large reservoir of tuberculosis infection still prevailing in most parts of the country. We can do this—but only through a continued and concerted effort to find and treat larger numbers of people annually in the early stages of their disease.—LEONARD A. SCHEELE, M.D., *Bull. Nat. Tuberc. A.*, May, 1955.

Minnesota Academy of Medicine

Meeting of October 13, 1954

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club on Wednesday evening, October 13, 1954. Dinner was served at 7:15 and the meeting was called to order at 8:10 p.m. by the president, Dr. C. N. Hensel.

There were fifty-five members and five guests present.

After a short business session, the scientific program followed.

Dr. James R. Dawson, Jr., of the University of Minnesota Department of Pathology, read his inaugural thesis entitled "The Pathogenesis of Hyaline Membrane Disease in the Newborn." Lantern slides were shown.

THE PATHOGENESIS OF HYALINE MEMBRANE DISEASE OF THE NEWBORN

A Preliminary Report

JAMES R. DAWSON, JR., M.D.

Minneapolis, Minnesota

Almost thirty years ago, Johnson and Meyers[1,2] called attention to a special form of respiratory insufficiency in newborns. Johnson, a pathologist, was impressed by the eosinophilic membranes which were present in the lungs of these babies and he designated the lesion pneumonia with hyaline membranes. Since this original description, several important contributions have been made but there is little general agreement about the disease. For example, there is no universally accepted term for this disease but the "hyaline membranes" described by Johnson are still included in most of the terms in use today. I shall refer to this entity as hyaline membrane disease.

Hyaline membrane disease is now recognized as the commonest cause of death in premature infants and in full-term infants delivered by section or born of diabetic mothers. In Table I are shown the causes of death in autopsies on patients dying during the first week of life. These data are derived from a review of the autopsies performed by Fellows at the University during the four-year period 1949 through 1952. These 195 cases comprise 30 per cent of all autopsies on patients less than sixteen years of age. The importance of prematurity as a contributing factor in deaths during the first postnatal week is shown by the fact that 128 (65 per cent) of the 195 deaths were in prematures. Finally, there were fifty-eight cases of hyaline membrane disease in this group and fifty-three of them (90 per cent) were in prematures.

TABLE I. CAUSES OF DEATH IN INFANTS DURING FIRST POSTNATAL WEEK

Day of Death	Congenital Anomalies	Immaturity	Infections	Other Causes	Hyaline Membranes	All Causes
1	16/5	20/20	3/2	24/16	27/24	90/67
2	2/1	2/2	4/1	7/5	13/11	28/20
3	4/1	2/2	4/0	5/1	12/12	27/16
4	6/1	1/1	1/0	6/3	3/3	17/8
5	2/1	0	2/1	7/4	1/1	12/7
6	5/2	0	1/1	2/0	0	8/3
7	7/1	0	1/1	3/3	2/2	13/7
First Week	42/12	25/25	16/6	54/32	58/53	195/128

Numerator = Total Number.
Denominator = Number Premature or Immature.

The distribution of these fifty-eight cases of hyaline membrane disease, according to the weight of the baby, is illustrated in Table II. There is a peak incidence in the 1500 to 1999 gram group, with only four cases in infants weighing less than 1000 grams and only six in the groups above 2500 grams.

Another feature of interest in hyaline membrane disease is the relationship of length of survival to the development of the lesion. This is depicted in Table III. No infant exhibiting this lesion survived less than four hours and only two lived longer than 120 hours. Almost half of the deaths were in infants less than twenty-four hours old, and the highest incidence was in the six-hour to twelve-hour period. All of these data substantiate the findings in other studies on hyaline membrane disease.

From a clinical point of view, there are no features

which enable one to make this diagnosis with certainty. In the classical cases it has been said that the child ordinarily has no respiratory difficulty immediately after delivery. Following this so-called latent period there is progressive impairment of respiration. This is accompanied by retraction and cyanosis. Many of these infants die but some probably recover. Roentgenologic studies of these infants show variable changes which are not considered pathognomonic of the disease.

TABLE II. RELATION OF WEIGHT OF INFANT TO DEVELOPMENT OF HYALINE MEMBRANES

Weight of Infant in Grams	Number of Infants with Hyaline Membranes
Less than 1000	4
1000-1499	17
1500-1999	21
2000-2499	10
2500-2999	1
3000-3499	4
Greater than 3500	1

When one considers the importance of hyaline membrane disease as a cause of death in newborn infants, it is surprising to see how little the pathologist has contributed to knowledge of this entity. This lack of interest on the part of the pathologist is emphasized by the fact that hyaline membrane disease is not even mentioned in most of the popular textbooks of Pathology. However, the pathologists who have concerned themselves with the problem, notably Johnson,[1] Farber,[3] Potter,[4] and Arey,[5] have published accurate anatomical descriptions of the lesions.

Autopsy in the classical cases reveals collapse of alveoli, dilatation of many alveolar ducts and respiratory bronchioles and a dense eosinophilic membrane lining the ducts and respiratory bronchioles. There is ordinarily no cellular reaction and little edema or fibrin but in cases surviving longer than a week these changes may be conspicuous.

The characteristic anatomical and functional changes of this disease are seen almost exclusively in man. Numerous attempts have been made to produce the lesion in experimental animals by instilling amniotic fluid[6,7] and other materials[8] intratracheally, by bilateral vagotomy[9] and by high ambient O_2 pressures.[10] Some membranes have been produced, but the entire picture of membranes and atelectasis has not been duplicated. This lack of a suitable experimental model has undoubtedly been the most important factor in prolonging our ignorance of the pathogenesis of hyaline membrane disease. Failing so completely in the experimental approach, we have been forced to rely entirely on the study of human material to give us a proper understanding of its development.

The hypotheses which have been advanced to explain the pathogenesis of this disease have generally assumed that the atelectasis is resorptive in Type 4; that is, that the lungs were normally expanded with air initially but that, due to the formation of the hyaline membranes, many air spaces were thereby obstructed, the contained air was absorbed and atelectasis resulted. The secondary nature of the atelectasis having been assumed most of the arguments which have arisen are concerned with the nature and origin of the hyaline membranes. Suffice it to say that there is insufficient evidence to establish the origin of these membranes, but irrespective of whether they are derived from the plasma of the fetus or from the amniotic fluid, there is reason to doubt their importance as a cause of the atelectasis.

TABLE III. RELATION OF DURATION OF LIFE TO INCIDENCE OF HYLALINE MEMBRANES

Duration of Life in Hours	Number of Infants with Hyaline Membranes	Cumulation Totals	
		First Dav	First Week
Less than 4	0	0	
4-6	6	6	
7-12	11	17	
13-24	10	27	27
25-48	13		40
49-72	12		52
73-96	3		55
97-120	1		56
Over 120	2		58

It is commonly believed that the lungs of a fetus are atelectatic, and it is for this reason that the term "congenital atelectasis" has been used to describe the lungs of stillborn infants and of other infants who die soon after birth. The fetal lungs, of course, are airless and they are incompletely expanded, but certainly they are not atelectatic in the sense that this term is used to describe the postnatal airless lungs which are seen following complete bronchial obstruction. Microscopic examination of the fetal lungs shows a uniform and moderate distention of all portions of the respiratory tract, including the alveoli. The entire tract is filled with fluid which has free communication with the amniotic sac, but it should be mentioned that this communication with the amniotic sac is not essential for the proper development and distention of the alveoli by fluid for in infants with atresia of the larynx, the lungs are filled with fluid and are normally developed. Regardless of its origin, the fluid which fills the lungs has such a low protein content that the normal alveoli, alveolar ducts, et cetera, appear empty on microscopic examination. However, under abnormal circumstances, as in fetal anoxia, amniotic debris may be seen as far out as the alveoli.[4,5]

During delivery of the infant, some of this fluid is squeezed out but much remains and, with the first inspiration, fluid and air are drawn deeply into the lungs. With the establishment of respiration, there is a fall in pulmonary vascular resistance, and blood flow through the lungs is increased. This fall in pressure and increase in flow of blood lead to rapid resorption of fluid, and as the fluid is removed, air takes its place so that the lungs become fluffy and pale.

If, for any reason, there is exudation or transplantation of fluid into the normally expanded lungs, this fluid will displace air, but the alveoli will remain distended. When the situation which led to the edema is corrected, this fluid is ultimately resorbed and its place again taken by air so that the size of the alveoli, within

limits, remains unchanged as long as there is free communication through the bronchi to the outside.

For collapse or atelectasis to occur in any area of the distended lungs, that area must be isolated by blocking its communication to the outside. This is readily accomplished by the occlusion of the bronchus. Distal to the occlusion, air and fluid may be completely absorbed so that the walls of alveoli, alveolar ducts and respiratory bronchioles become closely packed, separated at most by an imperceptible amount of fluid.

It is evident, therefore, that the atelectasis seen in infants with hyaline membranes is of a special type for in this condition only the alveoli are atelectatic in the early stages of the lesion. The alveolar ducts are either normally distended or overdistended.

The bright pink membranes lining these distended alveolar ducts have attracted so much attention that they have overshadowed the atelectasis.[11] Most students of the disease have assumed that the membranes came first and that the atelectasis was secondary and resorptive in type.[4] In order for this situation to develop, one must postulate that the hyaline membranes occlude the orifices of the alveoli. It is difficult to understand how this can occur, since the alveoli represent rather shallow outpouchings of the alveolar ducts; their orifices are almost as wide as the alveoli are deep. Furthermore, if the membranes are precipitated from fluid within the lung, one would expect them to be deposited on all surfaces of the alveoli and alveolar ducts, but in hyaline membrane disease, they are deposited almost exclusively along the walls of alveolar ducts.

These observations make it difficult to believe that the hyaline membranes cause obstruction of alveoli and that the atelectasis is of the resorptive type but there is a more compelling reason to doubt that the membranes cause the atelectasis. Hyaline membranes are seen in conjunction with atelectasis in the classical lesion, but if these membranes are really the cause of the atelectasis, one should never see dilated alveolar ducts and collapsed alveoli in the absence of hyaline membranes, and one should occasionally see membranes in alveolar ducts without alveolar atelectasis. Our study of all autopsies on infants dying within two weeks after birth fails to substantiate such a relationship between hyaline membranes and atelectasis. In our material, we find a considerable number of cases which exhibit typical alveolar atelectasis and dilated alveolar ducts in the absence of hyaline membranes, and we have not observed situations in which the membranes were deposited prior to the development of alveolar collapse. Since there are reasons for doubting the primary importance of hyaline membranes in the pathogenesis of this disease, one should explore the possibility that the failure of alveoli to expand properly is primarily responsible for the development of this disease.

Little has been written about the manner in which the lungs of premature infants or animals expand normally, and much of this is probably inaccurate because of the methods of preparing the lungs for study. In order to obtain significant information, one must fix the lungs almost instantaneously *in situ* at a predetermined stage in the respiratory cycle. This has not been done. Lacking such definite information on normal expansion one is perhaps justified in speculating about the process.

The participation of bronchi and bronchioles in the process of normal expansion is probably more or less unimportant, except as simple conduits, for they do not vary greatly in cross-section area. The greatest change in size occurs in the alveoli, alveolar ducts and respiratory bronchioles. In these structures, variations in capacity are dependent upon increase in size of the thoracic cavity during inspiration followed by return to original size during expiration. In the latter phase, the inherent elasticity of the lungs plays some part.

When the size of the thorax is increased during normal inspiration, the lung is stretched in all dimensions. This stretching is a manifestation of the inherent elasticity of the lung, which resides in the elastic tissues and smooth muscle principally. This elasticity offers resistance to the changes in size and shape of the various pulmonary structures. Resistance is so great in the bronchi that they change very little, but in the respiratory bronchioles, alveolar ducts and alveoli, the change is relatively large, and the extent to which each of these structures increases in size will depend upon the pressure to which it is subjected and upon its elasticity. In normal distention of the lung, all of the pulmonary structures must participate, but the extent to which each enlarges must be regulated within rather narrow limits if proper alveolar ventilation and gas exchange are to take place.

The actual increase in size of these structures is related to the increase in lung volume which is probably never more than fourfold. In terms of the change in one dimension of a sphere, this would represent an increase of slightly less than 60 per cent. However, it is unlikely that inspirations of this magnitude occur in the neonatal period. Even a twofold increase would be very great and with this it would be necessary for each of the units to increase its diameter by only 30 per cent. Changes in any one dimension of alveoli or alveolar ducts are therefore quite small.

Expansion of alveolar ducts and respiratory bronchioles with a co-existing collapse of the alveoli might be explained on the basis of differences in distensibility of these units. Each of these structures has elastic tissue in its walls, and it is possible that quantitatively there might be more elastic tissue in the alveolar walls but this is not easily demonstrated. It might also be possible to explain differences in distensibility based on qualitative changes in elasticity of elastic fibrils, but this is even more difficult to prove. Smooth muscle is the other component which resists stretching. This tissue is present in the walls of respiratory bronchioles and alveolar ducts, but it is absent in the walls of alveoli. It is possible that changes in tone of this constituent might readily occur. Clinical examples of increased tone or spasm are well known, and I should like to suggest that decrease in tone of the smooth muscle in alveolar ducts might contribute to abnormal expansion of the lungs which characterizes hyaline membrane disease.

If the tone of the smooth muscle were diminshed,

then the relative distensibility of the alveoli would be less than that of the alveolar ducts and respiratory bronchioles, and they should expand less readily leading to over-distention of the alveolar ducts and respiratory bronchioles. Any fluid present would presumably accumulate in the alveoli as the ducts filled with air. Resorption of fluid would allow more space for air, and because of their distensibility, the ducts would increase in size still more, so that ultimately the alveolar ducts would crowd out the alveoli. Undoubtedly the explanation is not nearly this simple. The rôle played by surface tension in the pathogenesis of this lesion, although unknown, is quite likely an important one.

Those factors, which might be responsible for changes in tone of smooth muscle in the lung, are not known, nor do we know that loss of normal smooth muscle tone in the newborn would lead to the development of lesions like those seen in hyaline membrane disease. However, this concept offers a new approach which can be pursued from the experimental point of view.

Once the situation develops, with collapsed alveoli and distended alveolar ducts, membranes from several sources might be deposited. The deposition of these membranes would augment respiratory difficulty by covering the small surface available for exchange of gases.[14] In addition, these membranes might be detached from their sites of formation to lodge in the terminal portions of the bronchi, producing collapse of the subtended alveoli, alveolar ducts and respiratory bronchioles. In this way still more of the already inadequate pulmonary parenchyma is thrown out of function, and respiratory distress is increased.

Discussion

The pathogenesis of hyaline membrane disease is indeed complex, for it must include an explanation of the source of the hyaline membrane, the manner in which they are deposited within the lungs, and the relationship between these membranes and the atelectasis. In this paper, only the relationship between the atelectasis and the hyaline membranes has been discussed in any detail.

There are two possible sources for the material which comprises these membranes, amniotic fluid and the infant's own plasma. Although no one has determined the amount of protein present within the membranes, it seems likely that it is large, so large that normal amniotic fluid would not contain such a quantity. For this reason, it seems more reasonable to assume that at least a part of this material must be derived from the infant's own blood. The controversy over this point will continue until unequivocal evidence is adduced for the support of one side or the other. Regardless of the source of this material, there remain the problems pertaining to its deposition and to its relationship with the atelectasis. The latter point has stimulated much argument, but there is no convincing proof for any hypothesis.

The circumstances which lead to the deposition of these membranes have been more or less ignored. It is generally said that the protein-containing material within the lungs is ordinarily absorbed completely via the capillary bed and the lymphatics. Support for this statement stems from the numerous observations on the resolution of pneumonia and on the disappearance of pulmonary edema in heart failure. The exact mechanisms involved in the removal of protein are unknown, but in most situations the protein and the freely diffusable electrolytes and water are removed concurrently. Experimental evidence indicates that there may be some concentration of protein and other non-diffusible substances,[12,13] but on a purely physical basis, this concentration should be limited by the osmotic properties of proteins and other non-diffusable substances. Excessive concentration may occur when exudates on exposed surfaces dry faster than they can be rehydrated, but it is difficult to believe that this can occur in pulmonary parenchyma with its long series of bronchi and with its abundant capillary bed. Another possibility exists, namely the denaturation of protein with an accompanying diminution in its osmotic effect as seen in the transformation of fibrinogen to fibrin, but there is no direct evidence for or against this hypothesis.

Hyaline membrane disease of the newborn remains an enigma. Despite thirty years of work by many capable investigators, it is the major cause of death in premature infants. The problems which this disease presents are clearly defined, but none of them has been solved.

Conclusion

1. Hyaline membrane disease is the chief cause of death in the first postnatal week.
2. It occurs predominantly in infants weighing between 1000 to 2500 grams.
3. The lesions of this disease are not present at birth but require postnatal existence of one or more hours.
4. Anatomically, it is characterized by hyaline membranes lining distended alveolar ducts and by collapse of alveoli.
5. There is insufficient evidence to establish the origin of the membranes, the manner in which they are deposited or their relationship to the atelectasis.
6. It is suggested that abnormal expansion of the lungs is the primary abnormality and that the membranes develop secondarily.

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Discussion

DR. EDWARD P. BURCH, Saint Paul: I should like to ask whether there was any relationship between this condition and retrolental fibroplasia. There seems to be quite conclusive evidence that retrolental fibroplasia is due to improper use of oxygen in the premature child, and, while I realize this pathologic picture is not the same in the two conditions, I would be curious to know whether the two diseases have anything in common.

DR. DAWSON: There are two reasons why it has been suggested that high oxygen tension plays a rôle in the pathogenesis of hyaline membrane disease of the newborn. First, most infants who exhibit this lesion have been exposed to high concentrations of oxygen and, second, it has been shown by Dr. Allan Hemingway, of the University of Minnesota, that membranes can be produced in experimental animals which have been exposed to high concentrations of oxygen. I do not think there is good evidence to incriminate oxygen as a cause of hyaline membrane disease because this lesion is seen in infants who have not been exposed to high concentrations of oxygen and also because, in many instances, the infant is not put in oxygen until he exhibits respiratory difficulty. So far as I know, there is no significant relationship between retrolental fibroplasia and hyaline membrane disease.

DR. L. G. RIGLER, University of Minnesota: We have been interested in this because of the fact that in the roentgenological literature it has been reported that premature infants, who appear to be exceedingly ill, may exhibit what appears to be normal x-ray films of the chest. This leads to a good deal of puzzlement among those who observe it. The reason apparently lies in the dilated alveolar ducts so that the lungs appear reasonably normal, whereas there is no exchange of gases going on. We ourselves have not seen any that look entirely normal. Perhaps we have not seen them early enough. The fact is, however, that the roentgenograms of the chest do not show as much abnormality as one would expect considering the severity of the symptoms. In most of the cases we have seen there are stippled shadows throughout both lungs indicating the presence of collapsed alveoli. I would like to ask Dr. Dawson whether he thinks there may still be an earlier stage than we have observed in which the amount of air in the alveoli is still normal.

DR. DAWSON: I think the amount of air present in the lungs during life is probably greater than we see here. We have no way of fixing these lungs *in situ*. When we open the chest they collapse. I think this represents collapse over and above that which was present when the child was alive.

DR. H. L. ULRICH, Minneapolis: What was the condition of the diaphragm of these babies?

DR. DAWSON: So far as we know, there is nothing wrong with the diaphragm. I don't think we have any reason to believe that there is anything wrong with the way the air comes in. It is my idea that there is defective expansion of the alveoli.

DR. H. B. SWEETSER, Minneapolis: Is this a pathologist's disease or do we see it before?

DR. DAWSON: I think there is good reason to believe that some of these infants recover.

DR. H. F. FLANAGAN, Saint Paul: We see what clinically we call atelectasis,. Some recover slowly, then a certain number die in spite of good therapy. I think Dr. Dawson is to be complimented on his exploration of this subject. The ones that die shortly after birth are probably those with hyaline membrane disease, and likely of antenatal origin. Many of these infants have a bloody mucous sputum noticed an hour or two after birth. Again, I wish to thank Dr. Dawson for this presentation.

DR. W. P. SADLER, Minneapolis: How much of this is embryological to begin with?

DR. DAWSON: In infants weighing less than 1000 grams, the alveoli and the capillary bed within the lungs are incompletely developed, but as the lung matures, the structure of the alveoli becomes more apparent, the number of capillaries in the walls increases, and the lining epithelium disappears. The lesions of hyaline membrane disease are not seen in the extremely immature infants. This is not to say that the abnormal expansion does not occur in that period, but membranes are rarely seen. One wonders whether the paucity of blood vessels in the wall and the gland-like character of the alveoli may not be important insofar as the formation of membranes is concerned. I think there is no abnormality in the lungs which predisposes to the development of this disease.

DR. E. B. BERGLUND, Minneapolis (by invitation): A couple of years ago before this group, with Dr. Wyatt, I presented the problem of atelectasis in the newborn. At that time, we were trying to save some of these babies with thoracotomy. However, as we went along, we decided we could not determine beforehand which ones are going to live and which are not. Until we had better prognostic ability, we could not determine the value of this procedure of thoracotomy. However, it was of interest that of some twenty-four babies who were most severely ill and on whom we did thoracotomy, twelve were delivered by cesarean section and all had some abnormality of delivery. We were convinced that the method of delivery had something to do with this condition. It may be that immaturity of development as with premature infants, as well as some abnormality of delivery, has something to do with it. Dr. Taylor at St. Mary's Hospital studied the cases there. The great majority of the babies in which atelectasis occurred were born within one to two hours after the mother had received demerol; leading again to the thought that something in the method of delivery, anesthesia, or other procedure, had something to do with the development of atelectasis.

DR. DAWSON: I don't know that I am in a position to answer Dr. Berglund's question in any detail. The maternal records on many of our patients are not too good and we have not looked them over too carefully. As far as demerol is concerned, I have no information on that.

Dr. Harold Buchstein, of Minneapolis, then read his inaugural thesis on "The Radical Treatment of Brain Abscess." (To be published later.)

The meeting adjourned.

ROBERT E. PRIEST, M.D., *Secretary*

History of Medicine in Minnesota

THE PIONEER DOCTORS OF CHIPPEWA COUNTY PRIOR TO THE YEAR 1900

LEON G. SMITH, M.D.
Montevideo, Minnesota

(Continued from April, 1955, issue)

Dr. De Willis Little spent most of his active medical career in Appleton, but he practiced in Montevideo a short time. The *Montevideo Leader* of November 6, 1891, had this to say: "Dr. D. W. Little has located in Montevideo. Although a newcomer here, he is by no means unknown to the people of this vicinity. He is a graduate of the Keokuk College of Physicians and Surgeons and has had sixteen years of practice. He will attend calls at any time in either city or country. His office is located over the Golden Eagle Bldg. Clothing House."

On October 30, 1891, he was reported to have removed a cancer from the lip of August Schroeder.

He apparently moved to Appleton in the spring of 1892, from where, according to his card in the Montevideo papers, he held office hours in Milan on Tuesdays and Saturdays, at least for a time. He practiced in Appleton to the time of his death, many years later.

Another doctor, whose name appears in Montevideo for only a short time, was mentioned by the *Commercial* of July 8, 1893: **"Dr. R. F. McMoine,** who is a graduate of McGill University in Montreal, Canada, is locating in Montevideo." The *Leader* stated: "Dr. R. F. McMorine *(sic)* is a new physician, who has placed his card in the business directory and has begun practice in Montevideo. His office will be above J. C. Arnold's Restaurant."

His stay was brief, because his card had disappeared from the business directory two months later, in the September issue, and there is no further information about him.

The past few names have been of only minor interest because these men were in Chippewa County for but a short time. The next one considered ranks well toward the top in importance. This is due not only to length of service in the county, but to his active interest in civic affairs as well.

Dr. Reuben Dewitt Zimbeck was born April 23, 1857, at Sharon, Wisconsin, the son of Henry Zimbeck and Clarissa Lowell Zimbeck. The father was born in Germany and came to America as a boy of eight. The mother was born in New York State and was a relative of James Russell Lowell. The Zimbeck and Lowell families moved from New York between 1835 and 1840, and located near Sharon, Wisconsin, as farmers. There was only one other child in the family, but they decided that Reuben, who was not strong as a child, was not rugged enough for farm work, so he was given a better than ordinary education. He graduated from Sharon High School and from college at Carthage, Illinois. He taught school at intervals to help finance his education and worked a good deal in drug stores in Minda and Crystal Springs, Illinois, where he learned sufficient Pharmacy to become a registered pharmacist. It is probable that during the time he worked in

Minda he studied medicine under the direction of his uncle, Dr. Lorenzo D. Lowell, and through his encouragement, went on to medical school. He took pre-medical work at the University of Iowa and his medical work at Rush Medical College, graduating in 1885.

His first location to practice was in Morton, Minnesota, in 1886. He remained there for four years, and then moved to Montevideo, where he stayed until 1915.

September 18, 1890, at Eagle Lake, Minnesota, he was married to Jessie Van Dolah, whose father, Rev. Thomas T. Van Dolah, was one of the pioneer preachers of Minnesota. Dr. and Mrs. Zimbeck had two children, Vera Mae and Marian Lucille.

In every community in which he resided, Dr. Zimbeck took an active part in all civic affairs. This was especially true in Montevideo, because it was here that he lived the longest (25 years) and those were the years of his prime. His most outstanding contribution in public affairs was in getting telephone service into Montevideo. As Dr. Rogers is given credit for bringing the Milwaukee Railroad division point to Montevideo, Dr. Zimbeck is credited with bringing the telephone here. He helped organize the Citizen's Telephone Company and, as its president, on May 5, 1899, announced that his company had bought out the local business of the Minnesota Central Telephone Company. This consolidation gave the home company the control of seventy-five to eighty instruments. This work took many long hours of his time, for which he received no pay except the satisfaction of helping his community.

In addition, he was a member of the finance committee of Windom Institute. He served upon the Village Council for several terms, some of them as president, and acted as secretary of the District Medical Society for many years.

He was not a member of any religious denomination, but was a regular attendant of the Congregational Church. He was also a devoted member of the I.O.O.F. for many years.

He moved from Montevideo to Maynard in 1915 and practiced there until his death in 1927, leaving his wife, who survived him for several years, and his daughters, Vera Zimbeck Hartley, now living in Deer Lodge, Montana, and Marian, now of St. Peter, Minnesota.

I knew Dr. Zimbeck well, and had great admiration and respect for him. He was a voracious reader, and was probably better posted on matters, both outside and inside his profession, than most of the doctors of his generation.

His practice was never as large as it should have been, commensurate with his ability as a doctor, especially in the field of diagnosis. I think it is fitting to copy an article by Richard Carlson in the *Maynard News,* following his obituary. It is a tribute, not only to Dr. Zimbeck, but to all similarly consecrated country doctors of the old school.

"THE COUNTRY DOCTOR"

"In the death of Dr. R. D. Zimbeck, our community lost a man of great abilities and fine character. The venerable old doctor was a true friend of mankind as well as a competent minister to its bodily infirmities. He always took time to season his prescriptions with a generous dose of sunshine and jaunty hopefulness. In recognition of his merits and work, therefore, let us for a moment reflect on the hardships and responsibilities attending the lot of those splendid heroes, the country doctors, of whom Dr. Zimbeck was one. They stand ready at all times of day or night to come to the bedside of the ailing. While we other mortals are enjoying the warmth of our houses, they are out fighting their way through blizzards and

snowdrifts to allay the sufferings of humanity. In times of epidemics, when other people desert their best friends, the ever faithful practitioners stay on the job, bracing their minds and nerves for the extra work, knowing that the added strain and fatigue are undermining their own health. And in too many cases, their only reward is the pleasure of seeing their ministrations yield satisfactory results.

"Such deeds of sacrifice filled Dr. Zimbeck's long career of service to his fellowmen. In homage to his nobility of spirit, let us show our gratitude by trying to be equally unselfish in heart and deed, so that his efforts may find response in our enjoyment of a fuller share of health and happiness."

It is perhaps proper, at this time, to mention briefly the boys of Chippewa County who studied medicine and graduated during this period.

An account has already been given of **Dr. H. W. Rogers** and **Dr. Finn Koren.**

Dr. Oscar Frink was, fittingly, the first to so graduate, as his father, G. W. Frink, was generally considered to be the founder of Montevideo inasmuch as he was one of our earliest settlers, and the city was built on the land which comprised his original farm. Oscar graduated from Medical school February 2, 1891, and located in Wisconsin, where he lived and practiced at Pepin and Alma.

Dr. Oscar Bergstrom was mentioned several times in news items as helping the various doctors, undoubtedly during his vacations from medical school. The last item concerning him appeared December 3, 1892, and stated that he had graduated, was practicing at Cooperstown, North Dakota, and was in Montevideo, attending his brother-in-law professionally.

Dr. Charles Corse graduated June 11, 1897. The *Commercial* of October 1, 1897, told how "he worked upon the Murphy threshing rig until it completed its run. He left last Saturday by bicycle for his new field at Hewitt in Todd County, Minnesota, to locate in medical practice." Another item in the *Commercial* of July 29, 1898, after the beginning of the Spanish-American War, stated that he was an Assistant-Surgeon in the United States Army at Chickamauga; that he had received the twenty-five dollars donated by the loyal women of Hewitt and Montevideo; and that he had turned the money over to the hospital fund for use as needed.

With the exception of the very short time that Dr. N. A. Nelson was in Milan and Watson as early as 1885 or 1886, the smaller towns of the county had no resident doctors before 1894. In that year, one came to Milan and probably, also, one settled in Clara City. Maynard's first doctor located there in 1898 and Watson had none until the early 1900's.

Dr. Kristoffer Lundevall graduated in 1893 from the Christiania Medical College, which was probably a part of the University of Norway. He must have come to the United States soon thereafter, as the Medical Directory listed him in Milan in 1894. The *Milan News* of February 1, 1895, recorded his arrival there, with offices over the bank of Milan, but he was not licensed in Minnesota until October 8 of the same year. His name appeared occasionally in news items until November 26, 1897, when he was reported as leaving Milan to return to Norway. As his name never reappeared in the Medical Directory, it is to be assumed he remained there.

Dr. Henry W. Reiter appears to have been the first doctor to locate in Clara City. The Scott and Carver County records show that he graduated from the University of Minnesota in 1893, and first set up practice in Kerkhoven in Swift County. However, a news story in the *Montevideo Commercial* of September

14, 1895, indicated he must have settled in Clara City for a short time, namely "Dr. Reiter, formerly of Clara City, is now located at Kerkhoven." Later, in the year 1897, he located permanently in Shakopee, where the remainder of his life is covered in the "History of Medicine in Scott and Carver Counties."*

Following Dr. Reiter in Clara City was **Dr. Robert S. Davis,** about whom we have almost no information. There was no report in the Medical Directory except that he graduated from McGill University in 1894 and was listed in Clara City in 1896. An item in a Montevideo paper, August 12, 1896, mentioned his riding over from Clara City on his wheel, and brief mention of him also occurred in 1897, 1898 and finally June 30, 1899. In the Medical Directory of 1900, his name appeared from Lakeville, Jackson County, with the comment "no report." In 1909, his address was given as unknown.

After the names of several men of only passing interest, we come to one of much greater importance, as he practiced in Montevideo a considerable length of time and had the ability and personality to make a deep impression upon the history of the county.

Dr. Hans Waldemar Hendrickson was born near Copenhagen, Denmark, February 20, 1868. He had no full brothers or sisters. He came to America at the age of eight, making his home with an aunt near Watson, Minnesota. School attendance was very irregular, amounting to only a few weeks in rural schools each year. However, he did become well educated by self-teaching, as he used most of his spare money to buy books, and, even while working in the field and resting the horses, he would take a book along to read at such intervals.

By the age of eighteen, he was able to answer the requirements of a rural schoolteacher, and he taught several terms. Some schools had over thirty pupils, several of whom were older than he. In this way, he earned enough money to start studying medicine at the University of Minnesota. So, with no eighth grade or high school diploma, this immigrant boy fulfilled his life-long ambition to become a doctor.

While teaching a rural school in Swift County, he boarded at the home of Peter Ness, whose niece, Thora Ness, born in Vaage, Tessenden, Norway, had come to this country and acted as her uncle's housekeeper.

Hans and Thora were married before he started medical school, so it was hard sledding financially, but he worked in the University laboratories to help pay his way and provide for his family. There were three children, John, Melvin and Ella.

Dr. Hendrickson graduated from the University of Minnesota Medical School in 1893, served a two year internship in a hospital in Canton, South Dakota, and then set up an office for practice in Montevideo in October 1895. He never practiced in any other location.

He was on friendly terms with the three other competing doctors, Rogers, Bacon and Zimbeck, and news stories of the period frequently mention his having assisted, or been assisted by, one of them.

He was a member of the Synod Lutheran Church in Montevideo and belonged to many fraternal orders, including the Odd Fellows, the Woodmen and the Masonic Lodge. He served as Worshipful Master of the local lodge of the latter and also held at least one of the grand offices. He was especially interested in Masonic history and literature, and owned a large library of such works. He was also quite a gardener and horticulturalist and was very fond of music.

Minnesota Medicine, p. 798, July, 1948.

Like most doctors of the time, much of his work was country driving, and he kept two teams and hired a driver, so that he did much of his sleeping on the road. As his sons became older, they also helped in the driving. He had a buggy made to order for better resting. In the winter he had a quilt sewed up to form a sack, into which he could slip his feet with hot bricks or soap-stones to help keep warm.

He performed many an emergency operation in his own home upon the extended dining-room table.

He was quite a linguist, being able to speak fairly well in French, Spanish and German as well as his daily-used Scandinavian and English.

During the last few years of his life, his health was poor and he had to give up the more strenuous duties of his profession. However, he did considerable real estate business during this period and took extended trips to Mexico and Canada.

He was sick for several months before his death, which occurred December 1, 1912, due to Bright's Disease. It was a tragedy for his family and his community for so good and brilliant a man to die so young, only forty-four years.

One son, Melvin, died a few years later, but another son, John, lives in Sheridan, Wyoming. His daughter, Ella Hendrickson Nash, in Platte, South Dakota, and his widow, now 89 years old, is making her home with her daughter.

Dr. Tord Neilson was in Chippewa County but a very short time and there is little information about him. Dr. Drought's "History of Ottertail County from 1870 to 1940" states that he graduated from the University of King Frederick, Christiania, Norway, in 1881. He came to the United States soon thereafter, as he was licensed in Minnesota in 1883, with one of the earliest licenses issued, No. 19. At that time his address was Fergus Falls, Minnesota, and he continued to practice there several years. We know he was in Chippewa County in 1895 and 1896 as the following items appeared in the *Montevideo Commercial.* In the issue of January 11, 1895: "Dr. Tord Neilson, from Christiania, Norway, will be at Simon Bue's Hotel January 15." On March 15, 1895: "Dr. Tord Neilson moved into his new offices in Raffelson's Block, Monday." On May 10, 1895: "Dr. Tord Neilson, assisted by Drs. Murphy and Rogers, amputated the arm of an 80 year old man Tuesday."

Dr. Neilson was listed in Polk's Medical Directory as being in Montevideo in 1896, but no mention was made of him in the Montevideo papers after 1895, so it may be assumed that he moved that year to North Dakota. One item, however, might indicate that he first moved to Minneapolis from Montevideo, then returned to Fergus Falls about 1898 and 1899. At any rate, he was listed in Polk's Medical Directory from Kenmare, North Dakota from 1902 to 1906. Apparently he practiced there, and possibly at Edmore and Grafton, North Dakota, for many years.

(To be continued in October issue)

Reports and Announcements

MEDICAL MEETINGS

National

American Association of Blood Banks, eigth annual meeting, Palmer House, Chicago, Illinois, November 19-21, 1955.

American Congress of Physical Medicine and Rehabilitation, Hotel Statler, Detroit, Michigan, August 28-September 2, 1955.

Association of Military Surgeons of the United States, Hotel Statler, Washington, D. C., November 7-9, 1955.

National Society for Crippled Children and Adults, Palmer House, Chicago, Illinois, November 28-30, 1955.

Pacific Northwest Industrial Health Conference, Multnomah Hotel, Portland, Oregon, September 12 and 13, 1955.

International

International Symposium on Enzymes: Units of Biological Structure and Function, Henry Ford Hospital, Detroit, Michigan, November 1-3, 1955.

AMERICAN DERMATOLOGICAL ASSOCIATION ANNUAL PRIZE ESSAY CONTEST

The American Dermatological Association is offering a series of prizes for the best essays on original unpublished work on fundamental aspects of dermatology or syphilology. Prizes of $500, $400, $300 and $200 will be awarded for papers judged first, second, third and fourth, respectively. Competition is not limited to physicians but is open to scientists generally.

Manuscripts must be submitted in triplicate, should not exceed 10,000 words, and should be sent in under a nom de plume, with correct identification of the author in a separate sealed envelope. Deadline for the contest is November 15, 1955.

Entries should be sent to Dr. J. Lamar Callaway, Secretary, American Dermatological Association, Duke Hospital, Durham, North Carolina. Further information about the contest can be obtained by writing to that address.

AMERICAN UROLOGICAL ASSOCIATION OFFERS ESSAY AWARDS

The American Urological Association offers prizes of $500, $300 and $200 for essays on the result of clinical or laboratory research in urology. Competition is limited to urologists who have been graduated for not more than ten years and to men in training to become urologists. The first prize essay will be presented at the annual meeting of the association in Boston in May, 1956.

For complete details about the contest write William P. Didusch, Executive Secretary, 1120 North Charles Street, Baltimore, Maryland. Essays must be submitted before December 1, 1955.

MINNESOTA ACADEMY OF OCCUPATIONAL MEDICINE AND SURGERY

At the annual meeting of the Minnesota Academy of Occupational Medicine and Surgery on May 25 the following officers were elected: Dr. Leslie W. Foker, president; Dr. James R. Fox, vice president; Dr. Orley W. Foster, secretary, all of Minneapolis; Dr. John A. Williams, St. Paul, recorder; Dr. Tracy E. Barber, Austin, treasurer, and Dr. Gordon MacRae, Duluth, executive committee.

Named as fellows in the Industrial Medicine Association were Dr. James R. Fox and Dr. Wilford E. Park, both of Minneapolis. Dr. John F. Shronts, Minneapolis, was elected to the board of governors of the Industrial Medicine Association.

DISCONTINUATION OF THE RHEUMATIC FEVER PROGRAM, CRIPPLED CHILDREN SERVICES, DEPARTMENT OF WELFARE

The Rheumatic Fever Program of the Crippled Children Services of the Department of Welfare, which provided medical consultation and hospitalization for children from fifteen Minnesota counties, was discontinued as of June 30, 1955. This action was taken because federal funds for this special pilot project were withdrawn after careful study revealed a diminishing case load. It will be necessary to procure rheumatic fever diagnosis and treatment services for the children who previously would have been referred to the program, from the existing medical centers.

During the year beginning July 1, 1955, however, the Department of Welfare will continue to provide nursing consultation in heart disease to the public health nursing services in collaboration with the Minnesota Department of Health, but on a state-wide basis rather than just to the fifteen counties previously covered. Medical social work consultation will be available from the department on a limited basis upon request.

CONTINUATION COURSES

The University of Minnesota will present a continuation course in *Pediatrics for Pediatricians* September 21 and 22. Under the auspices of the Center for Continuation Study, the course will be held in the Mayo Memorial Auditorium on the University campus. One-half day will be devoted to each of the following general subjects: infectious diseases, hypersensitivity diseases, central nervous system disorders, and endocrine and metabolic abnormalities.

The guest faculty will include Dr. Lewis Thomas, professor of pathology, New York University College of Medicine, New York City, who will also deliver the Irvine McQuarrie Lecture on Thursday evening, September 22. The course will be presented under the di-

(Continued on Page 529)

In Memoriam

EDWARD HAROLD FROST

Dr. E. H. Frost, physician of Willmar, died in Willmar, June 2, 1955. He was seventy-nine years old.

Dr. Frost was born in Willmar in 1875, son of Dr. and Mrs. E. S. Frost. He attended the University of Minnesota and Louisville Medical College. Upon completion of his training, he began the practice of medicine with his father.

He had been a senior warden at St. Luke's Episcopal Church, where he and Louisa Wilcox were married, and where they celebrated their fiftieth wedding anniversary in 1949. He was a member of the Board of Education in Willmar, a city health officer, and division surgeon of the Great Northern railroad.

Dr. Frost was chief of staff at Rice Memorial Hospital and president of the Great Northern Surgeons Medical Association. He was a member of the Crow River Medical Society, the Kandiyohi-Swift-Meeker County Medical Society, the Minnesota State Medical Association, and the American Medical Association. He served for a time as vice president of the state association.

Dr. Frost is survived by his wife and three sons: Dr. Russell Frost, Glen Lake Sanatorium; Charles, an architect in Willmar, and William, district manager of the Travelers Insurance Company at Stillwater.

WENDELL B. GRINNELL

Dr. Wendell B. Grinnell, physican and surgeon of Preston, died May 30, 1955, at his home. He had suffered a stroke at his office on May 9. He was eighty-two years old.

Born in Waubeka, Wisconsin, Dr. Grinnell spent his boyhood in Saukville, Wisconsin. He attended normal school at Oshkosh and taught school before taking medical courses at Milwaukee College of Medicine and the University of Illinois. After a year of practice at Wykoff, Dr. Grinnell moved to Preston where he remained in practice for the next fifty-four years, until the time of his death.

Dr. Grinnell was a member of the Minnesota State Medical Association, and the Olmsted-Houston-Fillmore-Dodge County Medical Society. He was a member of the Preston O.E.S., Masonic Lodge, and Knights Templar. He served as a member of the village council and was county coroner for twenty years.

He is survived by his wife; his daughter, Mrs. Roger Vadheim of Tyler, Minnesota; two granddaughters, and a sister, Mrs. R. W. Brott of Marinette, Wisconsin.

WILLIAM ANTHONY MILLER

Dr. William A. Miller, born in Appleton, Wisconsin, on July 30, 1872, died in New York Mills, Minnesota, June 1, after nearly sixty years in the medical profession.

Dr. Miller graduated from the Kansas City Medical College in 1896. He then went to New York Mills and became an active member in many community activities. In February, 1953, a banquet was held by the Lions in New York Mills to honor Dr. Miller for his lifetime of service. He was a member of the school board and served on the Board of Health, as Deputy Coroner, as an examiner for selective service, and participated in many bond drives during both world wars.

He was a Life member of the Minnesota State Medical Association, the American Medical Association and had been a member of the Park Region District and County Medical Society since its inception. He was on the staff of St. James Hospital in Perham.

Dr. Miller is survived by his wife, Jessie; a sister, Mrs. F. G. Brabec, Perham; a son, Maurice, New York Mills; two daughters, Mrs. Oscar A. Carlson and Mrs. Eino Kyllonen, both of Minneapolis, and six grandchildren.

PHYLLIS E. ROSANDER

Dr. Phyllis Rosander, returning to Minnesota to enter practice after a residency at Sanford Hospital in San Francisco, was killed in a highway accident in Utah, May 29. She was thirty-four years old.

A native of Minneapolis, Dr. Rosander attended South High School, the University of Minnesota and the Woman's Medical College of Pennsylvania. She interned at Minneapolis General Hospital and was a fellow in obstetrics and gynecology at the University of Minnesota.

Dr. Rosander was a member of the Hennepin County Medical Society, the Minnesota State Medical Association, and the American Medical Association.

She is survived by her husband, Dr. Richard Leigh of Grand Forks, N. D., and Minneapolis; her parents, Mr. and Mrs. John E. Rosander, Edina; a brother, Dr. John E. Rosander, Jr., San Francisco; and a sister, Mrs. Harry Gustafson, Edina.

NEW CONTRAST MEDIUM IN UROGRAPHIC EXAMINATIONS

A new contrast medium in radiological examination of the urinary tract, called Hypaque, has produced encouraging results, according to two Cleveland, Ohio, radiologists.

Doctors Joseph C. Root and William C. Strittmatter, associated with the department of radiology of the Cleveland Clinic, reported their findings in the May, 1955, issue of the *American Journal of Roentgenology, Radium Therapy and Nuclear Medicine.* Some 350 patients were examined with the new substance.

Their conclusions were as follows:

The value of Hypaque as a urographic contrast medium is twofold: it makes possible excellent visualization of the urinary tract, and it diminishes the number of postinjection reactions.

In a series of 350 patients, less than 10 per cent had any type of reaction following injection of the medium, and in general the urograms obtained were "pyelogram-like" in quality.

Of General Interest

Two new members have been appointed to the Minnesota State Board of Health by Governor Orville Freeman. They are **Dr. Frank H. Krusen,** Rochester, who succeeds, **Dr. F. W. Behmler,** state senator from Morris, and **Dr. Edgar J. Huennekens,** Minneapolis, who succeeds Professor Charles V. Netz, Minneapolis. Reappointed to the board was Professor Herbert Bosch, Minneapolis, vice president of the board.

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Dr. L. E. Schneider of the Duluth Clinic, Duluth, attended the annual meeting of the American Psychiatric Association in Atlantic City from May 9 to 14.

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Dr. James F. Brusegard, Red Wing, was recently elected president of the Goodhue County chapter of the Society for the Mentally Retarded.

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Dr. Russell M. Wilder, Rochester, was given the gold key award of the University of Chicago Medical School alumni association at a dinner meeting of the group in Chicago on June 9. Dr. Wilder retired in 1951 as professor and chief of the department of medicine of the Mayo Foundation.

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A certificate of life membership in the American Academy of Pediatrics was awarded **Dr. Lillian L. Nye,** St. Paul, on June 18. Dr. Nye is also a life member of the American College of Physicians.

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Dr. Peter J. Pankratz, Mountain Lake, has been elected to the board of directors of the Minnesota Alumni Association. He will serve for a term of three years.

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The Minnesota Society for the Study of Diseases of the Heart and Circulation held its spring meeting at the Duluth Clinic, Duluth, on May 28. Local chairman for the meeting was **Dr. James J. Coll.**

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Dr. Alan R. Jay, director of laboratories at Swedish Hospital, Minneapolis, was the principal speaker at commencement ceremonies at the Minnesota School of Laboratory Technique in Minneapolis on June 23.

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Dr. C. Knight Aldrich, associate professor of psychiatry and neurology at the University of Minnesota, is leaving to become head of the department of psychiatry at the University of Chicago. Dr. Aldrich joined the staff of the University of Minnesota in 1947. While in Minneapolis he has been consulting psychiatrist for the Family and Children's Service and an attending psychiatrist at Minneapolis Veterans Hospital.

Dr. B. F. Pearson, Shakopee, attended the annual convention of International Rotary in Chicago on June 6 and 7. Dr. Pearson is president of the Shakopee Rotary Club.

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Dr. Oliver E. H. Larson, Zumbrota, has been named a member of the medical staff of the Olmsted Community Hospital, Rochester. With his appointment the staff membership now totals twenty-one.

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At the twenty-first annual meeting of the American College of Chest Physicians in Atlantic City, New Jersey, June 1 through 5, **Dr. Herman J. Moersch,** Rochester, was named president-elect of the organization. Elected as chairman of the board of regents of the college was **Dr. John F. Briggs,** St. Paul. **Dr. Jay Arthur Myers,** Minneapolis, was re-elected as chairman of the editorial board of the college journal, *Diseases of the Chest.*

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Dr. Josiah Fuller of the Duluth Clinic, Duluth, attended the annual meeting of the American Association for Thoracic Surgery in Atlantic City from May 24 to 27.

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A citation for outstanding community work was presented to **Dr. Charles C. Cooper,** St. Paul, by Macalester College recently. The citation was one of three which were awarded to alumni by the St. Paul college.

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Among Minnesota physicians who attended a combined meeting of pediatric societies in Quebec, Canada, during the middle of June was **Dr. Albert V. Stoesser,** Minneapolis. The organizations conducting the joint meeting were the American Pediatric Society, the British Paediatric Association, the Society for Pediatric Research and the Canadian Paediatric Society.

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June 26 was Dr. Sogge Day at Windom, with residents of the area and professional colleagues gathering to pay tribute to **Dr. L. L. Sogge** for his fifty years of service in the field of medicine. Keynote speaker on the program honoring Dr. Sogge was **Dr. Frederic J. Kottke,** former resident of Windom and now head of the department of physiotherapy at the University of Minnesota. The days activities included a dinner for medical men of the area, followed by an afternoon program of speeches and entertainment in the high school auditorium. Among the committee members who planned the day of honor for Dr. Sogge were **Dr. J. H. Dokken** and **Dr. H. P. Basinger,** both of Windom.

Principal speaker at high school graduation ceremonies at Kenyon on May 31 was **Dr. H. J. Svien,** Rochester.

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One of the speakers at a convention of the Minnesota Bankers Association in Minneapolis on June 14 was **Dr. Charles W. Mayo,** Rochester, who spoke on "The United Nations, Its Problems and Future."

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Dr. William R. Bagley, Duluth, was the main speaker at a meeting of the Duluth Multiple Sclerosis Society at St. Mary's Hospital, Duluth, on May 25.

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Dr. F. J. Plondke, who practices in Saint Paul, received an honorary degree of doctor of science at commencement exercises at Morningside College, Sioux City, Iowa, on May 30. Dr. Plondke is an 1895 graduate of the college.

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Dr. and Mrs. A. H. Borgerson, Long Prairie, left in mid-May for a six-week tour of Europe. While in Geneva, Switzerland, Dr. Borgerson attended a meeting of the International College of Surgeons, following which he joined a group of surgeons on a month's tour of European medical centers.

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"Observations of Metabolic and Anti-rheumatic Effects of Meticorten" was the title of a paper presented by **Dr. Howard F. Polley,** Rochester, at a two-day symposium preceding the annual meeting of the American Rheumatism Association in Atlantic City, New Jersey, on May 31 and June 1.

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Dr. Donald C. Balfour, Rochester, has been named winner of the American Medical Association's distinguished service award for 1955. A retired member of the Mayo Clinic since 1949, Dr. Balfour was previously head of the clinic's division of surgery and director of the Mayo Foundation for Medical Education and Research.

* * *

Four Minneapolis physicians presented a paper at a combined meeting in Quebec, Canada, in mid-June held by pediatric societies from the United States, Britain and Canada. Entitled "Ventral Septal Defect in Infants and Children (Results of Direct Closure in Twenty-five Patients)," the paper was presented by **Dr. Paul Adams, Jr., Dr. Brian Kiely, Dr. Morley Cohen** and **Dr. C. Walton Lillehei,** all of Minneapolis.

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Main speaker at commencement exercises at the Willmar School of Practical Nursing on June 26 was **Dr. W. E. Macklin,** Willmar. Eighteen practical nurses were graduated from the school, which is affiliated with the Rice Memorial Hospital at Willmar.

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Dr. M. J. Shapiro, formerly of Minneapolis, was recently awarded a distinguished achievement medal by the University of Minnesota. Dr. Shapiro, who helped to bring about the building of the University's Variety Club Heart Hospital, left Minneapolis in 1951 to practice in Beverly Hills, California.

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Dr. Bernard C. Halper, Hibbing, is now spending two days each week at Itasca Memorial Hospital at Grand Rapids, providing the hospital staff with diagnostic x-ray service.

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Dr. William L. Benedict, Rochester, retired head of the section on ophthalmology at the Mayo Clinic, was awarded an honorary doctor of laws degree at commencement ceremonies at the University of Michigan, Ann Arbor, on June 11. Dr. Benedict, who joined the Mayo Clinic in 1917, has been retired since 1950.

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Governor Orville Freeman has appointed **Dr. Magnus Westby,** Madison, to the state board of medical examiners to replace **Dr. J. F. DuBois,** Sauk Centre.

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Dr. Robert J. Delmore has left Roseau for New Orleans, Louisiana, where he is specializing in the practice of surgery at Charity Hospital.

* * *

Dr. McKaig Day was held at Pine Island on June 26, when residents of the area and medical colleagues paid tribute to **Dr. Carle B. McKaig** for his nearly fifty years of medical and civic service to the community. Principal speaker at the afternoon program honoring Dr. McKaig was **Dr. Charles W. Mayo,** Rochester. Also appearing on the program were numerous other medical and civic leaders. The honorary day ended with an evening program featuring musical entertainment and a fireworks display.

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Dr. Ivan D. Baronofsky, former associate professor of surgery at the University of Minnesota and director of surgical research at Ancker Hospital, St. Paul, has been appointed chief of thoracic surgery at the U. S. Naval Hospital, San Diego, California. Dr. Baronofsky entered military service last February.

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Construction of the Albany Medical Center has begun at Albany, and completion of the clinic is expected early this fall. The center is being built by **Dr. F. H. Baumgartner** and **Dr. R. J. Salk,** who formed a medical partnership last January. The clinic will be 32 by 76 feet, with facilities for three physicians and their assistants.

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Dr. Randall G. Sprague, Rochester, was presented with a merit award on June 10 by his Northwestern University graduating class of 1930.

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Dr. Ralph T. Taubert, psychiatrist at the Rochester State Hospital for the past two years, has moved to California and become a member of the staff of Patton State Hospital, San Bernardino.

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The Brainerd Clinic, founded in 1896, has moved from its original location into a new clinic building

in west Brainerd. The clinic, which was founded by the late **Dr. J. L. Camp** and **Dr. John Thabes, Sr.**, is now operated by **Dr. John Thabes, Jr., Dr. G. I. Badeaux** and **Dr. Maurice Meller.**

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Dr. W. W. Rieke, Wayzata, was the subject of a brief biographical sketch in the Town Toppers column of the *Minneapolis Star* on June 17. The column features biographies of outstanding citizens.

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Dr. Eric P. Lofgren, Rochester, a medical missionary for the Lutheran Church, has left for Eket, Nigeria, West Africa, where he will head the Lutheran Synodical Conference Hospital. He was accompanied and will be assisted by his wife, Dorothy, a medical secretary, and Ethel M. Giziewski, a missionary nurse and former administrative pediatric supervisor at the University of Minnesota Hospitals.

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The New Brighton Clinic, construction of which was recently completed in New Brighton, has opened its doors to the public. The new medical center is operated by **Dr. R. J. Houle** and **Dr. D. J. Dummer.**

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Dr. N. E. A. Leppo, Duluth, spoke on the subject, "Children's Health Around the World," at a meeting of the Nettleton Parent-Teacher Association on April 21.

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Dr. W. E. Park, occupational health physician with the Minneapolis Health Department, has been awarded a fellowship in the Industrial Medical Association in recognition of his contributions to industrial medicine.

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The award of merit of the Ohio Valley Proctologic Society has been given to **Dr. Louis A. Buie,** senior consultant in the section of proctology at the Mayo Clinic, Rochester. The award was made during the recent annual meeting of the American Proctologic Society in New York City.

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Three Duluth physicians participated in a television program on cancer over WDSM-TV on April 17. Taking part in the question-and-answer forum were **Dr. F. H. Magney, Dr. W. J. Ryan** and **Dr. F. J. Hirschboeck** of Duluth.

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Three medical exhibits planned and produced by members of the staff of the Mayo Clinic were given top honors at the annual meeting of the American Medical Association in Atlantic City, New Jersey, early in June. The gold medal, highest AMA award for exhibit presentation, was awarded to "Esophagitis," an exhibit prepared by **Dr. H. W. Schmidt, Dr. F. H. Ellis, Jr., Dr. Arthur M. Olsen, Dr. J. H. Grindlay** and **Dr. A. H. Bulbulian.**

Receiving the certificate of merit in the section on general practice was the exhibit, "Congenital Dysplasia and Dislocation of the Hip," by **Dr. L. E. Harris** and **Dr. Paul R. Lipscomb.** The third winning exhibit, "Cushing's Syndrome: A Progressive and Often Fatal Disease," by **Dr. Randall G. Sprague, Dr. James T. Priestley, Dr. Waltman Walters, Dr. R. V. Randall, Dr. R. M. Salassa** and **Dr. D. A. Scholz,** was awarded the certificate of merit as best in the section on internal medicine.

NEW LOCATIONS

Dr. John Flatt, formerly of Fargo, North Dakota, has completed a residency at Philadelphia General Hospital and has moved to Wabasha, where he is a new member of the Community Clinic.

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Dr. Harry F. Burich has moved to Rochester from LaCrosse, Wisconsin, and has been named to the staff of the Olmsted Medical Group.

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Dr. Ralph F. Mach has returned to Pine City after two years in military service and has reopened his offices for the practice of medicine.

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Dr. A. H. Thompson, formerly of Litchfield, has moved to Madelia and become associated in practice with **Dr. H. E. Coulter** and **Dr. W. J. Hruza.**

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Dr. Jack K. Gardner, a native of Fairmont, who recently completed a surgical residency at Northwestern Hospital, Minneapolis, has opened offices for the practice of medicine at Ceylon.

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Dr. Jack A. Guy, who has been with the Public Health Service at the White Earth Indian Hospital for two years, has returned to New London and reopened his practice there.

MINNESOTA BLUE SHIELD-BLUE CROSS

During the month of April, 1955, 12,461 participant subscribers were enrolled in Blue Cross bringing the net enrollment as of April 30, 1955, to 1,007,886 participant subscribers.

Hospitalization expense for the month of April, 1955, amounted to $1,508,700.60, or a decrease of $257,-103.30 over the previous month. Past statistics reveal that the month of March is usually the peak month for cases admitted and hospitalization expense incurred by Blue Cross subscribers. The April decrease of $257,-103.30 though considerable is in accord with past years' experience.

It is interesting to note that the decrease in April over March, 1955, was attributed to a lower Blue Cross usage by members plus a reduction in the length of stay of each patient. A total of 13,615 Blue Cross subscribers required hospital care during April, 1955.

Commencing July 15, 1955, erection of 200 Scotchlite Blue Cross-Blue Shield highway signs will get under way throughout Minnesota.

The signs, 9 feet by 13 feet, will feature an exact replica of the Blue Cross-Blue Shield emblems in highly reflective scotchlite, emphasizing the slogan: "You Need Them Both."

Located at the bottom portion of each sign will be a courtesy panel whereby the exact distance to the next city or town will be shown in scotchlite.

The locations for the signs have been carefully selected so as to assure positions where the traffic count is high.

Blue Cross-Blue Shield realizes the necessity of constantly reminding the public of the importance of their benefits under both plans . . . and to those who are not members, the necessity of prepaid hospital, medical, surgical, maternity protection. It followed, that highway signs located in strategic positions throughout Minnesota, could augment this job most economically.

The objective of the program is twofold: The service feature of the distance-to-the-next-town, courtesy panel will be accepted with enthusiasm throughout the state. Also, the constant reminder theme emphasizing both Blue Cross-Blue Shield will supplement the excellent work already being done by the doctors and hospitals.

The program will be completed by August 15, 1955.

Of interest to all physicians are the improvements in both the Blue Shield contract and its schedule of payments, which have been approved by the Board of Directors for services rendered Blue Shield subscribers on and after July 1, 1955.

Briefly the improvements in the new contract provide as much as 120 days of in-hospital medical care or combined surgical and in-hospital medical care each 12 months for each unrelated eligible condition or illness instead of the 70 days previously provided.

Another highly important improvement in the contract is the addition of benefits for x-ray treatment. Both deep and superficial x-ray treatments rendered Blue Shield subscribers on and after July 1, 1955, for such conditions as cancer, blood diseases, female disorders and certain skin lesions, as listed in the schedule of payments, are provided in this revision of the contract.

In addition to the increased benefits provided in the contract, extensive revision of the schedule of payments makes available more liberal medical, surgical and other related service benefits for services rendered Blue Shield subscribers on and after July 1, 1955.

Among the important benefit increases are the addition of allowances for intensive in-hospital medical care in certain illnesses and electroshock treatment in psychiatric cases. Also, there are some 42 increases in benefits for surgical procedures and related services. Anesthesia services have been so changed that many subscribers will receive greater anesthesia benefits. Thirty-two new items which have not previously been listed in the schedule of payments have been added. Improvements in the wording and description of a number of items have been made to bring the schedule of payments up to date with the present-day practice of medicine.

All of these many improvements in both the Plan A and the Plan B contracts and schedules of payments are being made without any increase in the rates or cost of the contracts to the subscribers. These increased benefits mean several hundred thousand dollars more in benefits paid to doctors of medicine for subscribers' medical, surgical and maternity care each year, and are possible only as a result of the increased enrollment and the support and co-operation of the members of the medical profession.

CONTINUATION COURSES

(Continued from Page 524)

rection of Dr. John A. Anderson, head of the department of pediatrics. Registrants will also be invited to attend the meeting of the Northwest Pediatric Society which will be held on Friday, September 23.

The University of Minnesota announces a continuation course in *Office Psychotherapy in Psychosomatic Problems* from September 7 to 9. The course will be held at Douglas Lodge located deep in the woods of northern Minnesota on the shores of Lake Itasca.

The therapeutic management of psychosomatic patients will be the central theme, and the techniques of value to the general physician and to the non-psychiatric specialist will be emphasized. The course will be presented under the direction of Dr. Donald W. Hastings, professor and head of the department of psychiatry and neurology.

Sessions will be arranged to permit time for fishing, boating, and other recreational activities. The fee will be $130, which will include registration, tuition, meals and lodging, instructional material, transportation to Douglas Lodge and return, and fishing license. Further information may be obtained from the Director of Continuation Medical Education, 1342 Mayo Memorial, University of Minnesota, Minneapolis 14, Minnesota.

A continuation course in *Clinical Chemistry for Physicians* will be presented by the University of Minnesota October 6 to 8. The two-and-a-half day session, which will be held in the Center for Continuation Study and the University of Minnesota Hospital Laboratories, has been designed to help the physician in setting up and supervising laboratory procedures in his own office or local hospital. Attendance will be strictly limited, and instruction will consist principally of actual experience at the laboratory benches. Dr. Ellis Benson, acting director of clinical laboratory medicine, will be in charge of instruction.

The University of Minnesota announces a continuation course in *Techniques in General Practice* which will be held at the Center for Continuation Study and the University of Minnesota Hospitals on October 20 and 21. The course will consist principally of demonstrations of certain techniques of interest and importance to the physician practicing general medicine such as tracheal intubation, tracheotomy, and exchange transfusion. Registration will be limited. This program will be presented on the two days immediately following the annual refresher course of the Minnesota Academy of General Practice which will be held in Minneapolis on October 19.

The University of Minnesota in conjunction with the Minnesota Tuberculosis and Health Association will present a continuation course in *Tuberculosis for Lay Persons* particularly interested in this field. The course will be held at the Center for Continuation Study on the University of Minnesota campus from October 10 to 12, and emphasis will be placed on the public health aspect of tuberculosis.

BOOK REVIEWS

Books listed here become the property of the Ramsey, Hennepin and St. Louis County Medical Libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

A PRIMER OF ELECTROCARDIOGRAPHY. Third Edition. George E. Burch, M.D., F.A.C.P., Henderson Professor of Medicine. Tulane University School of Medicine; Physician-in-Chief, Tulane Unit, Charity Hospital; Consultant in Cardiovascular Diseases, Ochsner Clinic, Ochsner Foundation Hospital, Veterans Administration Hospital; Visiting Physician, Touro Infirmary; Consultant in Medicine, Hotel Dieu, Illinois Central Hospital, New Orleans; and Travis Winsor, M.D., F.A.C.P. Assistant Clinical Professor of Medicine, University of Southern California Medical School; Director of Nash Cardiovascular Foundation, Hospital of the Good Samaritan; Junior Attending Physician, Los Angeles County Hospital; Junior Attending Physician and Diplomate, Children's Hospital, Cardiac Department, Los Angeles. 286 pages. Illus. Price $5.00. (Philadelphia: Lea & Febiger, 1955.

DOCTORS IN THE SKY. Robert J. Benford, M.D., Colonel, Medical Corps, United States Air Force. 326 pages. Illus. Price $8.75. Springfield, Ill.: Charles C Thomas, 1955.

This is the story of the development of the Aero Medical Association. Louis H. Bauer, M.D., "the father of Aviation Medicine," founded the organization in 1929. Since that time there have been twenty-six annual meetings. The advance of aviation medicine is unfolded by relating the events of each meeting.

From the early medical problems involved in "blind" flying (now known as instrument flight) up to the present medical aspects of supersonic flight and space medicine, the reader is impressed by the strong alliance between medicine and aeronautics.

The rôle of Aviation Medicine in the Military, Civil Aeronautics Administration and in the commercial airlines is related in historical perspective.

Of special interest to Medicine in Minnesota are the important contributions made by two former Minnesota physicians, John P. Stapp, M.D. (Minn. '44) and W. Randolph Lovelace II, M.D. (Mayo Clinic '34-'41).

Dr. Stapp (Col., USAF) is at present conducting experiments in deceleration for the Air Force. Dr. Stapp has traveled up to speeds of 632 miles per hour on a rocket-powered sled, and he has withstood a deceleration force of 35 G.

Dr. Lovelace developed and tested for the Air Force oxygen bail-out equipment. He successfully parachuted to earth from 40,000 feet and, in conducting this experiment, he discovered that the opening shock of a parachute at high altitudes was extremely high. Previous to this time, it was thought that the opening shock would be less due to the decreased density of the atmosphere. Along with Drs. W. M. Boothby and A. H. Bulbulian (other Mayo researchers), Dr. Lovelace developed the now famous BLB oxygen mask.

I found the Aviation Medicine aspects of the book very intriguing; however, at times the narration becomes tedious when documenting the administrative side of the Aero Medical Association.

J. E. Power, Jr., M.D.

FIRST PROSECUTION UNDER PHYSICAL THERAPY LAW

(Continued from Page 510)

though there was no law in Minnesota whereby physical therapists could register as such, the defendant was informed that she was violating the Basic Science Law and could not legally continue her practice or maintain an office. She subsequently was employed as a nurse by a doctor of medicine in Rochester who stated that he had taken entire charge of her work, so she was not prosecuted at that time.

In 1951, the Legislature of Minnesota passed a law providing for the examination and registration of physical therapists by the Minnesota State Board of Medical Examiners. The law also provides that any person not registered as a physical therapist who in any manner represents himself as a physical therapist, shall be guilty of a gross misdemeanor. Miss Lundeen never submitted an application to the Board for registration as a physical therapist. In Minnesota, a physical therapist is defined as a person who practices physical therapy "under the prescription, and direct supervision of a person licensed and registered in this state to practice medicine and surgery and whose license is in good standing." Miss Lundeen, even if registered, could not maintain an independent office.

The records indicate that Edith Ingeborgh Lundeen was born in Sweden in 1898 and that after graduating from Red Wing City Hospital, in Minnesota, she became registered as a nurse in this state on December 1, 1923. The Minnesota State Board of Medical Examiners and the State Examining Committee for Physical Therapists wishes to commend Mr. D. P. Mattson, Olmsted County attorney, for the able and efficient manner in which he handled this case.

MINNEAPOLIS WOMAN SENTENCED TO SERVE TWO-YEAR TERM FOR ABORTION

Re: State of Minnesota vs. Alma Dora Peterson

On June 24, 1955, Alma Dora Peterson, sixty-six years of age, 4168 Bryant Ave. N., Minneapolis, entered a plea of guilty to an information charging her with the crime of abortion, before the Hon. Earl J. Lyons, Judge of the District Court of Hennepin County. On the same date, Mrs. Peterson also pleaded guilty to an information charging her with three prior convictions for felonies and thereupon the Court sentenced her to be imprisoned in the State Reformatory for Women at Shakopee, Minnesota, for a term of not to exceed two years. Judge Lyons stayed the execution of the sentence to July 5 to permit Mrs. Peterson to arrange her personal affairs. Because of her three prior convictions the defendant could have been sentenced to life imprisonment.

Mrs. Peterson was arrested on May 5, 1955, by Minneapolis police officers following the hospitalization in Minneapolis General Hospital of a twenty-three-year-old divorcee who was suffering from the aftereffects of a criminal abortion. The defendant admitted that she had performed the abortion upon the patient on April 30, 1955, by means of a catheter and wire, using a coat hanger for the wire. After doing the abortion, for which she was paid the sum of $50.00. Mrs. Peterson instructed the patient to take quinine tablets and castor oil.

The defendant, who has no medical training, has been sentenced three times in the past in Hennepin County District Court on abortion charges. On the first two occasions, on December 21, 1934, and February 21, 1944, she was placed on probation. However, on April 12, 1948, Mrs. Peterson entered pleas of guilty to two informations, one of them charging her with the crime of abortion and the other charging her with having two prior convictions for felonies. She was then sentenced by the Court to serve one year in the Minneapolis Women's Detention Home.